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COOPERATIVE AGREEMENT

Water Yield Improvement, Salt, Verde, and Gila Basins

Contract No. 16-68
Line Project No. FS-RM-1606

FINAL REPORT

Dr. Thomas W. Barrett

Professor of Agronomy
Arizona State University
Tempe, Arizona

Property of
U. S. Forest Service
Rocky Mountain Forest and Range
Experiment Station

Included with the report were about 98 pressed plant specimens which have been turned over to Mr. Horton for the herbarium.

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Introduction

This agreement was made and entered into on 1 July 1965 between the Rocky Mountain Forest and Range Experiment Station and Arizona State University. Dr. Thomas W. Barrett was designated as principal investigator in the project, responsible for planning and directing the project with approval of representatives of the Rocky Mountain Forest and Range Experiment Station.

Funds did not become available for the project until 15 November 1965, which was too late in the season to locate sampling sites and collect soil samples from the experimental forest at the head of Workman Creek in the Sierra Ancha Mountains. The winter months were spent training assistants and formulating plans.

Collection of Soil Samples

On 8 June 1965 an initial visit was made to the Workman Creek area in company with Mr. Lowell Rich for the purpose of surveying the area and deciding on the criteria for locating sampling sites. On this visit several soil samples were obtained for a preliminary analysis. These data were submitted by letter to Mr. Herbert C. Fletcher dated 28 June 1965.

The first soil sampling pits were located and excavation began on 6 June 1966. These pits were excavated by hand and had the approximate dimensions of 2 feet wide by 4 feet long by 3 to 4 feet deep depending upon the difficulty encountered in digging. Soil moisture samples were also taken for each depth increment.

The sampling pits were numbered in consecutive order as they were dug for a total of 17 sampling pits. These numbers appear on the map of the area submitted in the progress report of 12 July 1966. Subsequently it was found desirable to renumber these sampling sites as shown in Table 1. In the revised numbering system the pits are numbered consecutively from lower to higher elevations on each watershed followed by the letters N = North Fork, M = Middle Fork, S = South Fork, O = Open Area, and F = Forested Area at time of sampling.

TABLE 1 Numbering System of Sampling Pits

North Fork		Middle Fork		South Fork	
Revised Pit No.	Original Pit No.	Revised Pit No.	Original Pit No.	Revised Pit No.	Original Pit No.
1 NO	1	1 MO	3	1 SF	14
2 NF	13	2 MF	2	2 SF	15
3 NO	8	3 MO	4	3 SF	5
4 NF	10	4 MF	7	4 SO	6
5 NO	11	5 MF	17	5 SO	16
6 NF	9	6 MF	12		

Figure O is a map of the three watersheds in Upper Workman Creek showing the approximate location of all sampling pits by the revised numbering system.

On 22, 23 October 1966 additional samples of soil were obtained from all three drainages of the surface foot of soil taken at 4 inch increments. These samples were taken 30 paces magnetic east of each numbered survey stake. The sample locations are identified by the letters N, M or S indicating which drainage, North, Middle, or South Fork, followed by the number of the survey stake. Thus N-33 means that soil sample was obtained 30 paces east of stake number 33 on the North Fork drainage.

These last soil samples were obtained just before the clear cutting operations on the North and South Forks made it impossible to locate all the survey stakes. It would be desirable to resurvey both the North and South Forks, locating each stake as it was originally placed. This would permit accurate location of each soil sampling site for future comparisons of the management effect on the soils.

As the pits were dug soil samples were collected at each 4-inch increment sufficient to fill a one-half gallon ice cream carton (see Figure 19). The soil was passed through a sieve of hardware cloth having 1/8 inch openings to remove rocks, roots and other debris. An additional sample of about 200 grams of soil was collected from each increment for a gravimetric soil moisture determination.

As soil samples from each depth increment was passed through the sieve the rocks from that depth ranging near the size of a golf ball were collected for identification and this data is presented in Table 2.

Soil Profiles

An attempt was made during the summer of 1967 to obtain intact soil profiles from several of the sample pits (see Figure 18) but frequent rains kept the soil wet which made it impossible to get good profiles since the method of stabilizing and removing the profile is most effective on dry soils. It was decided after this experience to prepare artificial profiles of each 4-inch increment of soil from the surface to the bottom of each pit. Duplicate profiles of each pit were prepared in a plexiglass frame. The right hand profile was moistened with a fine spray of water just prior to taking a photograph then the synthetic profile was photographed in full sunlight using Ektacolor S Professional color negative film. With this film under these conditions the best color was obtained in the final prints as shown in Figures 1 to 17.

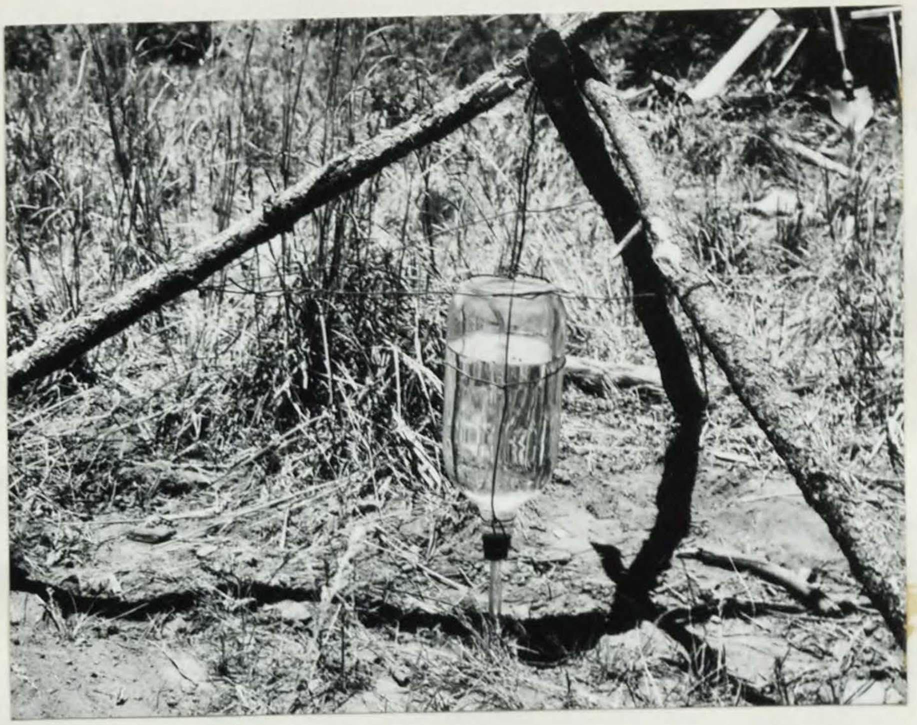
After the profile was photographed the wet and dry colors of each 4-inch increment were determined using the Munsell notation and the data presented in Table 5.

TABLE 2. Types of Rocks Found at the Sampling Locations on the Three Drainages of Upper Workman Creek.

Sample Location	Kind of Rock	Sample Location	Kind of Rock
N4	Sandstone	S2	Sandstone
N6	Sandstone	S5	Sandstone
N22	Shale, Granite	S18	Granite
N44	Sandstone	S31	Diorite
N48	Sandstone	S41	Diorite
N56	Sandstone	S58	Diorite
N68	Sandstone	S68	Granite
N74	Shale	S79	Granite
N98	Granite	S101	Granite
N116	Granite	S132	Granite
1 NO	Shale, Sandstone	S140	Granite
2 NF	Granite, Quartzite	1 SF	Granite
3 NO	Sandstone, Quartzite	2 SF	Granite
4 NF	Sandstone, Quartzite	3 SF	Granite
5 NO	Granite, Quartzite	4 SO	Granite, Quartzite
6 NF	Sandstone, Quartzite	5 SO	Granite, Sandstone
1 MO	No Rocks	4 MF	Sandstone, Quartzite
2 MF	Sandstone, Quartzite	5 MF	Sandstone, Granite
3 MO	Sandstone, Quartzite	6 MF	Quartzite, Quartzite

Infiltration Rates

At the time the sample pits were dug, single-cylinder infiltrometers as described by Haise, et. al.[1] were installed at three locations around the pit to determine the infiltration rate of water at the soil surface. A typical surface infiltrometer is illustrated in the photograph below.



Surface infiltrometer in operation.

The cylinders were carefully driven into the soil to a depth of 8 to 10 inches leaving at least 1/2 inch of cylinder above the soil surface. A 3 liter bottle containing exactly 2 liters of water was hung on a tripod above the cylinder. The bottle was equipped with a delivery tube and pressure relief tube in such a way that a constant layer of water approximately 1/4 inch deep was automatically maintained on the soil surface inside the cylinder. Each bottle had a metric scale fastened to its side in such a way that the water level inside the bottle could be measured. All bottles were of the same size and capacity so that they would have closely the same calibration. Thus each centimeter on the scale was equivalent to 125 ml of water. The scale reading and time were recorded at the beginning and scale readings recorded every half hour until the water level dropped below the scale. At this point the delivery tube was closed, the bottle turned upright and the remaining water poured into a graduated cylinder. This volume subtracted from the original 2,000 ml at the start gave the total volume of water infiltrating into the soil during the elapsed time. From this data the infiltration rate was calculated. If all three infiltrometers were in close agreement the values obtained were averaged. In some areas it was difficult to get a good seal between the cylinder and the surrounding soil due to rocks, roots or channels. In such instances additional measurement were made or the values not included in the average.

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[1] Haise, Howard R., et al, "The use of cylinder infiltrometers to determine the intake characteristics of irrigated soils," ARS Document 41-7, May 1956.

Infiltration rates obtained at each sample pit when the pit was dug is summarized in Table 3 and also in Table 4 and Table 6.

An effort was made to measure the horizontal conductivity of the soil at Site 5-SO but no satisfactory method was devised that would permit such measurement. It appeared that there was a fairly large movement of water downslope within the first foot of the soil in this area but below 12 inches the rate of movement was so very slow that no evidence of movement could be detected.

It is interesting to note that surface infiltration rates were generally quite high around each of the 17 sample pits but the infiltration rates at the bottom of the pits became extremly slow. It was also observed in digging the sample pits that the soil at the bottom of the pits was moist to nearly saturated while the surface foot was very dry. This would indicate that the subsoil stores a large portion of the total precipitation and releases it slowly to the permanent streams of the three drainages.

All infiltration measurements that were taken were determined on dry soils at the surface before any summer rains. It would be interesting to see what effect rains would have on surface rates of water intake.

TABLE 3 Summary of Infiltration Rates

Site Number	Date	Average Surface Rate ml/cm²/hr	Average Surface Rate inches/hr	Average Pit Bottom Rate ml/cm²/hr	Average Pit Bottom Rate inches/hr	Inches Depth
1 NO	6/ 6/66	3.41	1.34	0.194	0.076	32
2 NF	7/26/66	10.58	4.07	0.280	0.11	48
3 NO	7/ 7/66	34.58	13.62	0.120	0.047	48
4 NF	7/ 8/66	(too rocky to obtain any data)				
5 NO	7/10/66	6.96	2.75	0.62	0.24	36
6 NF	7/ 9/66	(too rocky)		1.17	0.42	48
1 MO	6/ 8/66	14.84	5.85	0.07	0.028	48
2 MF	6/ 7/66	20.83	8.20	0.04	0.016	36
3 MO	6/ 8/66	14.30	5.64	0.13	0.051	48
4 MF	7/ 6/66	35.42	13.96	0.07	0.028	36
5 MF	7/29/66	9.19	3.62	0.35	0.014	54
6 MF	7/25/66	8.30	3.27	0.35	0.014	36
1 SF	7/27/66	9.45	3.72	(too compact)		36
2 SF	7/28/66	4.80	1.89	0.09	0.035	36
3 SF	6/ 9/66	6.98	2.75	(too rocky)		36
4 SO	7/ 5/66	1.80	0.71	0.04	0.016	36
5 SO	7/29/66	45.00	17.70	0.15	0.059	36

On 14, 15, and 16 August 1968 additional infiltration measurements were obtained on all three drainages. The data obtained is summarized in Table 4 as follows:

TABLE 4 Infiltration Measurements Made on Middle and South Fork Drainages of Workman Creek August 14, 15, 16, 1968

Site Number	Surface		4 inches		6 inches		12 inches		24 inches		Pit Bottom	
	*	**	*	**	*	**	*	**	*	**	*	**
2 NF	35.2	13.9	13.2	5.2	4.3	1.7	0.12	0.05	0.10	0.04	0.12	0.05
4 MF	12.8	5.0	---	---	---	---	---	---	0.14	0.05	---	---
5 MF	45.9	18.1	---	---	5.3	2.1	0.13	0.05	0.13	0.05	0.13	0.05
5 SO	4.5	1.8	---	---	4.0	1.6	0.10	0.04	---	---	0.5	0.2

* ml/cm²/hr

** inches/hr

Description of Soil Sample Pits

Site 1 NO. This sample pit was dug on 6 June 1966. It was located at the lower end of the North Fork drainage in a cleared area of the south slope directly south of the rain guage on the north slope. It was approximately one quarter of a mile up the drainage area from the north drainage weir. The sample pit (Fig. 49) was dug to the depth of 32 inches. Soil samples were taken at four-inch increments from the surface to the bottom of the pit. The surface one foot layer of soil was a very dark gray color, high in organic matter. Vegetation surrounding the pit was mostly grasses, chiefly orchard grass. Grass roots were most dense in the surface six inches but persisted on downward in progressively smaller amounts to the depth the pit was dug. There was a marked change in the color of the soil at 1 foot in depth from a dark gray to a light tan accompanied by an increase in compaction and a noticable increase in moisture content. Samples of soil for determination of moisture content were taken at 4-inch increments from the surface to the bottom of the pit. An infiltrometer was set up in the bottom of the pit. The rate of water infiltration at the bottom of the pit was extremely slow compared to the surface surrounding the pit. Numerous stones were encountered in digging the pit varying in size from about a cubic foot down to small pebbles. The majority of stones were from 3 to 5 inches in diameter. The sample pit was dug midway between two large ponderosa pine stumps which were about 15 feet apart. The west stump was 26 inches in diameter and had 115 growth rings. The east stump was also 26 inches in diameter and contained 109 growth rings.

Site 2 NF. This sample pit was dug on 26 July 1966. This site was located in the forested area about 600 feet north of the rain guage on the lower end, north side of the North Fork drainage. The site is surrounded by many large ponderosa pine trees, 9 of which were located within a 25 foot radius of the pit. There were five large pines located due south of the pit within fifteen feet. Other trees surrounding the area consisted of fir, Arizona walnut and a few oaks. The surface of the soil was covered with a litter of pine needles and fir needles to a depth of about two inches. Below this was a dark black mull layer some 1 1/2 inches thick. Below this was a thin white zone where the mull contacted the mineral soil that was filled with fungal threads. The surface 6 inches of mineral soil was a dark brown color, being colored heavily by organic matter. At approximately 8 inches in depth, there was a marked change to a bright yellow-orange color. This yellowish-orange color persisted to the depth of four feet, becoming somewhat more yellow at the bottom of the pit. A few rocks were encountered in this pit in the surface foot and they consisted of quartzite with a few small pieces of sandstone. At a depth of two feet, several large roots of pine trees penetrated through the pit and were cut off in the process of digging. The sample site itself was located on a ridge between two small drainage ways with numerous, fairly large, quartzite boulders lying on the surface. For this reason it was surprising to find so few stones in digging the pit. The infiltration rate at the bottom of the pit was much slower than the surface.

Site 3 NO. This sample pit was dug on 7 July 1966. The sample site was located on the south side of the right hand upper arm of the cleared area on the North Fork of Workman Creek. The surface foot of soil was a dark brown to black mineral soil high in organic matter content, a result of its history as a forest soil. It was covered by a layer of pine needles about two inches deep, below which was a mull layer about one inch thick. At approximately one foot there was a sharp change in color of the soil from dark brown to brown. This color persisted down to the depth of four feet. There was also a marked decrease in the organic matter content and in the texture of this soil below one foot. The surface foot of soil had a much higher sand content than the soil below which had a higher clay content. Numerous rocks were encountered in digging this pit and they varied in size from pebbles up to ten inches in diameter. Most of the rocks consisted primarily of quartzite and sandstone. The vegetation surrounding the pit, at the time it was dug, consisted primarily of the seeded grasses, such as orchard grass and shrubs such as the New Mexico locust which has invaded the area. Most of the roots encountered in digging the pit were those of grasses and a few of New Mexico locust roots about the size of a pencil. Infiltration rates at the surface were very rapid, amounting to over 13.5 inches intake per hour. Whereas, at the bottom of the pit, the intake rate was less than 0.05 of an inch per hour.

Site 4 NF. This pit was dug on 8 July 1966. It was located in approximately the center of the Y formed by the forest on the North Fork drainage. It was on a slight divide between two small drainages. The forest here was of a mixed coniferous type consisting of both ponderosa pine and fir. The soil was covered with about 1/2 inch mulch of pine needles. Below this was a layer about two inches thick of dark decomposed black organic material. This pit was one of the rockiest of all the pits dug. Some of the boulders were approximately a cubic foot in volume. Most of them were between a quarter and a half a cubic foot in volume with numerous smaller rocks and pebbles. The soil at the surface showed the characteristic forest-type soil, having a dark black mulch followed by a layer of dark to black organic material distributed through the mineral soil. At approximately one foot in depth there was a marked change in color to a light tan which persisted to the bottom of the pit, increasing somewhat in yellow coloration with increasing depth. There was a noticeable textural change in the soil as it changed color from the dark brown to yellow, with a noticeable increase of clay in the yellow soil. There were three large ponderosa pine trees--one to the north, one to the west, and one to the south of the pit--all within a radius of twenty-five feet. Because of the very rocky nature of this soil it was not possible to obtain infiltration rates with the infiltrometer equipment that we had.

We could not get a seal around the rings, either on the surface or in the bottom of the pit, therefore, no infiltration data was obtained at this site. Rocks encountered in digging this pit consisted primarily of quartzite and quartzitic sandstone, in which the grains of sand were cemented with iron oxide.

Site 5 NO. This pit was dug on 10 July 1966. It was located in the southeast corner of the north branch of the cleared area on the North Fork. Vegetation surrounding the pit consisted primarily of the seeded grasses and the invading New Mexico locust. The surface four inches of soil was a very dark brown color and contained a few small rocks. Below this the color became lighter and more redish until, at the bottom of the pit, it had a rusty red color. There was a noticeable increase in clay content with depth. Infiltration rates at the surface were slightly under 3 inches per hour. At the bottom of the pit the infiltration rate decreased to a little better than 0.2 of an inch per hour. The rocks encountered in this pit consisted primarily of sandstone, quartzite and pink granite.

Site 6 NF. This sample pit was dug on 9 July 1966. The pit was located about 500 feet southeast of Site 5 NO. It was in the forest and at the highest elevation of all sample sites on the North Fork. The surface of this soil was covered with a mull of pine needles about one-half inch thick at the surface and was underlain by some two inches of organic mull that was very black in color and well decomposed. Below this mull layer was a zone of approximately six inches of mineral soil high in organic matter and of a very dark brown to black color. This black zone of soil ended rather abruptly and blended into a light yellowish-orange colored soil that extended from approximately one foot below the surface down to four feet in depth, which was the bottom of the pit. There were a few small rocks scattered throughout the profile, mostly of sandstone and quartzite. At the bottom of the pit there were several large quartzite boulders of approximately six inches in girth and about eight inches long. A total of six such boulders were taken from the pit along with three somewhat smaller in size. The yellow soil had a consistency of a fairly heavy clay and was quite plastic and moist as it was taken from the pit. Near the bottom of the pit the soil had a moisture content approaching saturation. Surrounding this pit the dominant vegetation was white fir and ponderosa pine. One of the large pine trees near the pit was dead. A large ponderosa pine stood approximately fifteen feet southwest of the pit and much of the litter and debris on the ground undoubtedly came from this tree. The trees surrounding this pit, in a radius of twenty-five feet, have an average trunk diameter varying from four to ten inches, but most of them were about eight inches in diameter.

Site 1 MO. This pit was dug on 8 June 1966. It was located at the northwest corner of the lower Peterson Meadow. The vegetation was dominantly meadow grasses and a few weeds. Due east, some sixty to seventy-five feet, were two large ponderosa pine trees and two large oak trees. The area to the south was free of trees some two hundred feet and seventy-five to eighty feet to the west and north. The forest surrounding the meadow consists primarily of a mixed oak, pine, and fir. The surface foot of this soil was heavily permiated by grass roots. It was of a very dark brown color with excellent structural characteristics. No rocks were encountered in digging this pit. The texture varied from a loam to a heavy clay at the bottom of the pit. The most striking feature of the profile exposed in this pit was that the color of the soil tended to become darker as the depth increased. At the bottom of the pit the soil was a glistening, shiny black color. The pit was dug to a depth of forty-eight inches and then auger samples were taken for another four feet in the bottom of the pit, extending to a total depth of eight feet. The color and soil characteristics did not change from that observed at the four foot depth. Infiltration rates at the surface were nearly 6 inches per hour. Whereas, at the bottom of the pit, they decreased to less than 0.03 of an inch per hour.

Site 2 MF. This pit was dug on 7 June 1966. The site was located to the southeast of 1 NO, approximately 200 feet. It was located in a stand of uncut trees just inside the north boundary of the middle fork. Fifteen feet west and southwest of the sample site were two large fir trees that varied in diameter from twenty-four to thirty-six inches at the base. To the northeast, about fifteen feet was a large ponderosa pine of about two feet in basal diameter. The surface two feet of soil appeared to be of aluvial material that had been transported into the location. Many rocks were encountered in digging the pit. They varied from approximately six inches in diameter down to small pebbles. There were occasionally large boulders encountered of about twelve inches in diameter. The soil was profusely penetrated by roots from the surrounding trees. Most of the roots were of about one quarter inch in diameter and smaller. The soil in the surface two feet contained a considerable amount of very fine sands. At the two foot level there was a sharp line of demarkation between the gray soil above and the red soil below. The red soil below had a very heavy clay content and tended to stick together very tightly upon drying, forming extremely hard clods. The soil in the first two feet was quite dry approaching the wilting point. However, the red clay below two feet had a high moisture content. Infiltration rates varied from about 8 inches per hour at the surface to about 0.02 of an inch per hour at the bottom of the pit. Most of the rocks encountered in this pit consisted of quartzites and sandstones with a few granites.

Site 3 MO. This pit was dug on 8 June 1966. This site was located in the south center portion of the center meadow to the south of the weather station. The native vegetation of this meadow was mostly grass; however, in the spring of the year, many weeds sprout and grow. The surface ten inches of the soil was permeated with roots of the grasses and weeds, making a rather dense sod. The surface soil was a dark brown color, becoming somewhat darker with depth. At eighteen inches the soil becomes more compact and dark in color. From twenty-four to twenty-eight inches the soil appeared to be a black clay merging into a very dark gray clay. From thirty-two to thirty-six inches, on the north side of the pit, the soil was a very dark black clay of compact structure. In the center of the pit it was more friable, while at the south end of the pit it changed to a grayish compact clay. A few small rocks were encountered while digging this pit and they consisted mostly of quartzites and sandstones. The sandstones were heavily weathered and could be broken easily. Infiltration rates at the surface were a little over 5 1/2 inches per hour. Whereas, at the bottom of the pit the rate dropped to about 0.05 of an inch per hour.

Site 4 MF. This pit was dug on 6 July 1966. The site was located on the middle fork drainage, approximately a quarter of a mile northeast of the site of the old Peterson ranch house and orchard. It was just to the east of the old Murphy ranch wagon road. The forest was dense and consisted primarily of fir with a few ponderosa pines scattered about. Just to the west of the sample site were two large ponderosa pine trees; the nearest, approximately 12 feet away, had a diameter of about four feet. Beyond that, another 20 feet, was a large dead stump of a ponderosa pine. To the northeast, within a radius of 20 feet, were two more large ponderosa pine trees. All the other trees surrounding were fir, varying in diameter from one inch to eight inches. The surface of the soil was covered with a mulch of pine needles about one-half to an inch thick, below which was a two-inch dark black mull of decomposed organic material and below that was a mineral layer of soil that was black with organic matter. At approximately one foot in depth it changed to a yellowish-tan color and this color maintained to the bottom of the pit becoming somewhat richer in yellow. Numerous rocks and boulders were encountered in digging the pit. They consisted primarily of sandstone and quartzite. The largest boulders of quartzite were about a half a cubic foot in volume. There were many smaller rocks grading on down to gravel size. Numerous roots of pine and fir trees penetrated through the surface two feet of this soil. Surface infiltration rates of water were very high, amounting to about 14 inches per hour. While at the bottom of the pit, the rate decreased to about 0.03 of an inch per hour.

Site 5 MF. This pit was dug on 29 July 1966. This site was located in the middle fork drainage on the heavy forest just to the west of the upper meadow, southeast of the old Peterson ranch house site. It was located in the dense forest consisting primarily of fir but to the north of the pit, some 20 feet, there was a large ponderosa pine, having a basal diameter of about 2 1/2 feet. To the east was a small ponderosa pine of one foot in diameter. Around the pit there were several smaller ponderosa pine mixed with fir and a few small oak trees. Also, one small quaking aspen was 20 feet to the west of the site. The surface of the soil was covered with a mulch of pine needles and other organic debris to the depth of about one-half inch. Below this was a dark black mull area approximately one inch thick, below which the mineral soil was heavily mixed with organic matter and black in color to a depth of six inches. At this point there was a marked change in coloration and a decrease in the organic matter content. The soil became a yellowish-brown color and by two feet in depth it had a distinctly yellow color. At three feet in depth there was another change to a brighter yellow color which persisted to the depth of the pit, which was 4 1/2 feet. This soil has all the appearances of being derived from decomposed granite. It was quite high in clay and rather gummy. Only a few rocks were found in this pit and they consisted mostly of sandstone, quartzite, and two pieces of heavily weathered granite. Infiltration rates at the surface were about 3 1/2 inches per hour, decreasing to less than 0.02 of an inch per hour at the bottom of the pit.

Site 6 MF. This pit was dug on 25 July 1966. The site was located on the trail to Aztec Peak about a quarter of a mile south of Bear Lake. It is in the middle fork drainage in very dense forest. The vegetation surrounding the pit consisted primarily of fir with a large stump of ponderosa pine just 20 feet to the north. There was also an old stump of ponderosa just five feet to the west of the pit. Ten feet southeast of the pit was an old oak tree with a base of about one foot in diameter. The mull litter on the surface was only about a half-inch thick and consisted of pine needles, fir needles, and leaves of the oak tree. The mull below it was from one-half to one inch in thickness. It had a very dark brown color. The surface four inches of mineral soil was black in color with a heavy content of organic matter. Below this it began to change to a lighter brown color and at the depth of one foot the color became stablized to a reddish-brown which maintained to the bottom of the pit. This is one of the few soils that had a more uniform color that did not show the bright yellow coloration that many of the other pits had shown. The soil was of a somewhat heavier texture and there were a few small rocks and pebbles distributed through it. These rocks consisted primarily of sandstone and quartzite with an occasional piece of granite. Numerous small roots penetrated the pit from the fir trees surrounding it but there were no large roots. Infiltration rates were about 3 1/4 inches per hour at the surface, decreasing to less than 0.02 of an inch per hour at 36 inches.

Site 1 SF. This was dug on 27 July 1966. This was the lowest sample site on the south fork watershed. It was located about 200 feet above the south fork stream and a quarter of a mile southeast of the south fork weir. The forest was somewhat mixed and open. The dominant species of tree was fir; however, there were some large ponderosa pine scattered throughout the area. There was a large ponderosa stump to the south approximately 20 feet. There was another large ponderosa stump to the north about 6 feet. The surface of the soil was covered with a litter of ponderosa pine and fir needles and leaves of oak, and very many small twigs. This debris on the surface was about an inch thick, underlain by a dark mull of about one half inch in thickness and the dark organic color persisted for about an inch into the mineral soil. The mineral soil was of a sandy texture and appeared to be derived from decomposed granite. It had a dark brown color in the surface six inches and graded into a lighter brown color with depth. A few small rocks of about the size of a baseball and smaller were encountered in digging this pit and all were of granitic origin. One large pine root penetrated the soil at about the one foot level in one end of the pit and had to be cut off. Numerous other roots of smaller diameter penetrated through the pit. At 20 inches in depth the soil became very tight and compact and was very difficult to dig. It was interesting to note that practically all roots were confined to the surface 20 inches. The pit was dug to a depth of 36 inches. At this depth it was found to be too compact to establish infiltrometers. Hence, no infiltration rates were determined at the bottom of the pit. However, it was noted that a rainstorm occurring during the first night that the pit was dug left no water in the bottom of the pit. All the other pits that had been dug had several inches of rain accumulated in the bottom. Surface infiltration rates were about 3 3/4 inches per hour.

Site 2 SF. This pit was dug 28 July 1966. This site was located approximately one quarter of a mile west of the S turn after the road crosses the south fork of Workman Creek. The site was located in a rather heavy forest cover that has now been removed. The principal trees were fir with an intermixture of New Mexico locust and oak. To the southeast were four large ponderosa pine trees about 75 feet away. There were a few smaller ponderosa pines scattered throughout the area and the litter on the forest floor was composed primarily of the needles of pine and fir intermixed with oak and New Mexico locust leaves. This litter was underlain by a dark mull layer about one inch thick below which the dark organic material penetrated the mineral soil to the depth of approximately four inches. The soil then shaded into a lighter brown color which persisted to a depth of about two feet. At this depth a courser, yellowish granitic type soil was encountered. There were numerous roots about the size of a pencil and smaller penetrating through this soil. Most of the roots were in the surface two feet of soil with fewer roots below this depth. The occasional rocks encountered in digging this pit consisted of heavily weathered granite. Infiltration rates at the surface were about 2 inches per hour and at the bottom of the pit, which was 36 inches deep, the infiltration rate was slightly more than 0.03 of an inch per hour.

Site 3 SF. This pit was dug on 9 June 1966. This site was located on the south fork drainage about 300 feet west of the edge of the burn and 100 feet south of the road. The dominant trees in the area at the time were ponderosa pine. There were two large ponderosa pine trees to the east and numerous small ponderosa pines scattered around the area. Just to the northwest was a fairly large fir tree of about one foot in diameter. There was a mat of pine needles on the surface, underlain by a dark mull layer of approximately one inch thick. Below this was a black mineral layer of soil having a fair amount of organic matter in it to the depth of about four inches. Below 4 inches the soil changed to a somewhat lighter brown color which persisted to approximately two feet in depth. At this point a type of decomposed granitic soil material was encountered that was yellow in color. In the surface two feet there were numerous large rocks of granite. Some of these were approximately a cubic foot in volume, grading down to gravel size. Numerous roots of about an inch in diameter and smaller penetrated through the pit and were cut in the process of digging. At 36 inches the soil became very tight, compact, and rocky, making it impossible to get a good seal on the infiltrometer rings. Hence, it was not possible to get infiltration rates at the bottom of the pit. However, surface infiltration rates were about 2 3/4 inches per hour.

Site 4 SO. This pit was dug on 5 July 1966. It was located in the northwest portion of the burned area about 500 feet south of the road and 200 feet east of the west boundary of the burn. Vegetation in this area before the burn was predominantly ponderosa pine intermixed with some oak. There was a large ponderosa pine stump to the south of the pit about 20 feet and also one to the west and to the north. There was a dark gray layer of mineral soil to a depth of six inches which then graded abruptly into a light yellowish-red colored soil. This color continued down getting somewhat more yellow with depth. There was an increase in sand content with depth, becoming quite sandy at the bottom of the pit. The soil had the appearance of being derived from decomposed granite. Very few rocks were encountered in digging this pit and most of those encountered were from the size of a marble to a golf ball. They were predominantly of granitic origin, but a few of them were sandstone and quartzite. There was a distinct change in the structure of the soil at the depth of one foot and persisting down to the bottom of the pit. Upon drying, this soil cracked rather severely indicating a fairly high clay content. Since the area had been seeded to grasses there were numerous grass roots penetrating to the depth of three feet in the pit. Surface infiltration rates were the lowest of any measured, amounting to about 3/4 of an inch per hour. At the bottom of the pit, the rate dropped to less than 0.02 of an inch per hour.

Site 5 SO. This pit was dug on 29 July 1966. This was located in the southeast portion of the burned area of the south fork about 200 feet south of the road. The dominant species of trees was ponderosa pine before the burn occurred. However, there were some oak scattered through the area. Four large ponderosa trees were located to the south approximately eight to fifteen feet away. The ground was nearly level with some slope to the west. The area had been reseeded with grass. The surface soil was a dark brown color for about one inch in depth, a reminant of the previous mull layer from the forest soil condition. The surface mineral layer, to a depth of approximately four inches, was dark brown in color which then graded abruptly to a light tan color. This continued downward to a depth of approximately two feet where there was an abrupt change in both the color and texture. The soil became a light yellowish-brown and much higher in clay content. The soil had the appearance of being derived from granitic material. Several fairly large roots of previously growing trees penetrated through the pit and were cut off in the process of digging. Grass roots formed a rather thick mat in the surface six inches of soil and fine roots persisted down to the bottom of the pit, which was 36 inches in depth. A few rocks, ranging in size of a baseball down to gravel, were encountered in the pit. Most of them were of granitic origin, with a couple of small pieces of sandstone. Surface infiltration rates varied widely, ranging from 1.8 inches per hour to 17 3/4 inches per hour. The high rates occurred where there was grass sod; the low rates, where there was no sod and some erosion had occurred on the bare soil. At the bottom of the pit, however, the infiltration rate dropped to about 0.06 of an inch per hour.

Description of Waterways Experiment Station Sample Pits

In the spring of 1967 a cooperative agreement was entered into between Arizona State University and the Waterways Experiment Station, U. S. Army Corps of Engineers to conduct detailed studies of soil properties on 10 different sample site locations ranging from the Sonoran desert to the pine-fir area of upper Workman Creek. In this report only those sample sites within or near the Sierra Ancha Experimental Forest will be described and data from those sites submitted.

Site WES 3. This site was located in a saguaro stand in the bottom of a broad wash that extends from Roosevelt lake northeastward to the foothills of the Sierra Ancha Mountains. The site is approximately 1/2 mile south of the A-Crossroad and 2.6

miles west of the main road to Sierra Ancha and Young. The soil consists of about 20 percent of the total volume of particles smaller than 2 millimeters, the rest being gravel and boulders. The pit was dug on 12 June 1967 to a depth of 1 meter and samples of soil taken from between the boulders. A few roots ranging in size from 1 to 5 millimeters were encountered from an adjacent mesquite tree and a large saguaro cactus. There was no particular change in the structure, texture or appearance of the soil with depth. The textural grade throughout the profile of the pit was primarily that of a sandy loam. Surface infiltration rates averaged approximately 2 inches per hour. Because of the rocky nature of the soil at the bottom of the pit it was not possible to obtain infiltration rates there. The dominant vegetation at this site consisted of palo verde, mesquite, jojoba and saguaro cactus. This was an instrumented site and data on soil temperature, soil moisture, precipitation, light intensity, wind velocity, and maximum-minimum air temperatures were obtained for a period of 2 years.

Site WES 4. This site was located on the grass-covered slope approximately 1/4 mile north of the Base Rock Lysimeters below the Sierra Ancha Experimental Forest Headquarters. The pit was dug on 7 June 1967 to a depth of 30 inches where solid rock was encountered. The surface 6 inches of soil was a dark brown color heavily permeated with grass roots, containing nearly 4 percent organic matter and of a loam texture. At approximately 6 inches there was a noticable increase in the clay content and a change in color to yellow with a decrease in organic matter. Also the soil became much more compact. Numerous rocks and boulders were encountered throughout the depth of the pit and constituted approximately 70 percent of the total volume of the soil removed from the pit. Surface infiltration rates averaged 2.3 inches per hour. However, because of the shallow nature of the soil this rate would quickly decline as the 30 inches of loose material above bedrock became saturated with water. This site was not instrumented and only soil moisture and maximum-minimum air temperature data was obtained at this site over a 2 year period.

Site WES 5. This site was located in the dense chaparral about 1 mile west of the natural drainage watersheds on the west side of Parker Creek below the Experiment Station Headquarters. The pit was dug to a depth of 2 meters on 6 June 1967. The soil at this site consists principally of a coarse diabase sand extending below the pit depth with little change in texture or other characteristics throughout the profile. Numerous roots penetrated through the pit from the manzanita and shrub live oak growing nearby. A few diabase rocks were encountered distributed quite evenly throughout the depth of the pit and ranged in size from an inch to 5 inches in diameter. There was a compacted zone about 6 inches thick starting about 2 feet below the surface and another compacted zone at the bottom of the pit. Surface infiltration rates averaged 6.5 inches per hour decreasing slightly to 6.2 inches per hour at the bottom of the pit.

Site WES 6. This site was located on the east bank of Parker Creek about 300 feet north of the bridge on the road to the natural drainage watersheds. It is situated in a stand of oak and sycamore trees that grow along the creek with understory vegetation of manzanita, catclaw, and other chaparral type plants. The sandy loam soil was interspersed with numerous rocks and boulders ranging from gravel to a foot in diameter. At a depth of three feet several very large boulders were encountered that made it impractical to dig deeper. Numerous roots penetrated throughout the pit area from the trees and shrubs growing nearby. This pit was dug on 21 June 1967 and at the time of digging surface infiltration measurements were made. These rates varied from 3.4 to 13.5 inches per hour with an average rate of 9 inches per hour.

Site WES 7. This site was located on the middle fork base survey line about 500 feet west of the access road into the

Peterson Ranch Meadow on upper Workman Creek. The pit was dug on 19 July 1967. The pit was located in a thick stand of mixed pine and fir ranging from saplings to mature trees. The surface of the soil was covered with a mat of pine needles about an inch thick with a dark organic mull layer below about 2 inches thick merging into the mineral soil. The pit was dug to a depth of 2 feet where large boulders were encountered that prevented going deeper. The soil profile to this depth consisted of about 50 percent of the total volume in rocks and boulders. The clay loam soil was extensively permeated with the roots of the surrounding trees. It was very difficult to get surface infiltration data due to the rocky nature of the soil. The measurements on the dry soil varied from 0.86 to 5.9 inches per hour with an average rate of about 4 inches per hour. It was not possible to measure infiltration rates at the bottom of the pit because of the large boulders present.

Site WES 8. This site was located in the center meadow of Peterson Ranch about 400 feet east of the Forest Service weather station. It was in the open meadow where the dominant vegetation was native grasses. The pit was dug on 20 July 1967 to a depth of 2 meters. The soil was very similar in appearance to that of Site 1 MO being very black in color throughout the entire depth and of a clay loam to clay texture. No rocks were encountered larger than an inch in diameter while digging the pit and only a few of these were found in the first foot of depth. This was a most interesting soil because of the shiny black color, excellent structure and ease with which the pit could be dug. Surface infiltration rates averages 2.3 inches per hour but at the bottom of the pit the rate was only 0.02 inches per hour.

Site WES 9. This site was located about 1/4 mile north of the old home site on the Peterson Meadow to the right of the old wagon road to the Murphy ranch. It was located in a forested area consisting of mature ponderosa pine and young fir trees.

The pit was dug on 18 July 1967. The surface soil was covered with a 2 inch mat of pine needles below which was a 3 inch black mull of organic material merging into the mineral soil. The soil at this location was a clay loam for the first foot changing to a clay below this depth. The pit was dug to a depth of 30 inches where large boulders were encountered that prevented digging further. About 40 percent of the soil volume consisted of rocks and boulders. The surface two feet of soil was heavily permeated by roots from adjacent trees but as the soil texture became heavier there was a noticeable decrease in the number of roots. Surface infiltration rates averaged about 5 inches per hour. Although rates at the bottom of the pit could not be obtained, they would undoubtedly have been very slow in comparison.

Analytical Procedures

In general the procedures used for both physical and chemical analysis of the soils in this study are described in the two volumes entitled METHODS OF SOIL ANALYSIS published by the American Society of Agronomy. The analytical data derived directly from the soil samples collected are presented in Tables 7, 8, 14, 15, 16, 17, 18, and 19.

Soil Reaction (pH) These determinations were made on soil passing a 2 mm sieve. Sufficient soil was taken for both pH and soluble salt determinations which amounted to 200 grams of oven dry soil. The soil was moistened with distilled water sufficient to make a glistening paste. This paste was allowed to equilibrate for about an hour with occassional stirring then the pH was measured using a Beckman Zeromatic pH meter.

Total Soluble Salts After determining the pH of the soil paste the soil was transfered to a Buchner suction funnel fitted with a Whatman No. 42 filter paper and a saturation extract obtained from the paste with suction. The electrical conductivity of this saturation extract was determined with an Industrial Instruments Solubridge equipped with a pipette conductivity cell. From the electrical conductivity in millimhos per centimeter the total soluble salts in parts per million were calculated.

Bulk Density From each sample depth small clods of soil about an inch in diameter were collected and the bulk density of these clods determined by the waxed clod method from the weight of the clod in air and its weight when submerged in water. When it was impossible to obtain clods of sufficient size then artificial clods were made from the fine soil by wetting about 100 grams and allowing it to dry into a clod. The bulk density measurements reported here are only for soil material less than 2 mm in diameter. In some areas the soil was so extremely rocky that the bulk densities determined and reported here will be considerably less than the bulk density of a volume of soil that included the rock.

Organic Matter The organic matter content of the soils were determined by the Wakley-Black wet combustion method utilizing concentrated sulfuric acid and 1 N potassium dichromate as the oxidizing agents and o-phenanthroline as the redox indicator. As would be expected the organic matter decreases with depth being most abrupt in the surface four inches of soil.

Total Nitrogen The total nitrogen was determined by the macro Kjeldahl method and the values obtained closely parallel those of organic matter but at a much lower level.

Textural Grade The textural grade was determined from the particle size analysis obtained by the Bouyoucos hydrometer method. Sodium hexametaphosphate (calgon) was used as the dispersing agent and all soils that contained more than 3% organic matter were first pre-treated with 30% hydrogen peroxide to remove the organic matter as a cementing agent.

Soil Moisture As each sample pit was dug soil samples were collected in soil moisture cans the the moisture content determined gravimetrically. Since these pits were dug during the driest season of the year the values are significant for they show the amount of moisture retained in the soil from the winter season and how it varies with depth. Those pits which show a marked change in soil moisture content between the surface and the bottom of the pit were dug before the summer rains started. Those pits in which there is little difference in moisture content of the soil from the surface to the bottom of the pit were dug after the first summer rains occurred.

Dispersion Percentage This value is a measure of the effect that water has on the stability of the soil aggregates. The higher the degree of dispersion the less stable are the soil aggregates and the higher will be the erodibility potential of the soil. The dispersion percentage is determined by dividing the non-dispersed silt and clay by the total dispersed silt and clay. The non-dispersed silt and clay is determined by placing 50 grams of air dry soil in a Bouyoucos cylinder. The soil is first passed through a 2 mm sieve and its moisture content determined. The cylinder is filled with distilled water to the 1130 ml mark with the hydrometer inserted. The hydrometer is removed and the cylinder contents stirred by stoppering the cylinder and inverting it rapidly at least 20 times. The cylinder is placed on the table and the time noted. It is unstoppered and the hydrometer inserted. The hydrometer reading is recorded at the end of 40 seconds from the time the cylinder came to rest and the temperature of the suspension recorded. This 40-second reading represents the non-dispersed silt and clay when corrected for temperature. The dispersed silt and clay is the value obtained for the 40-second reading of the standard Bouyoucos procedure corrected for temperature. These data appear in Table 9.

Available Soil Nutrients The Neubauer method was used to determine the supplying power of these soils for both essential and non-essential elements. Into 4 inch square by 4 inches deep polyethylene dishes was placed 100 grams of soil passing a 2 mm sieve. To this soil 100 grams of coarse, acid-washed silica sand was added and the soil and sand mixed together. On this mixture was added 100 grams of sand then 100 Elbon rye seeds were planted. Another 100 grams of sand was placed on top of the seed. Check plantings were made in which the containers had only sand. 80 grams of water were added to each dish to bring the moisture content of the mdeium to an optimum level and promote germination of the seed. Each day the containers were weighed and water added to restore that lost by evaporation and transpiration. At 18 days after planting the percent germination was determined and the plant tops harvested. These tops were dried, ground, placed in vials marked by code numbers and sent to the Wisconsin Alumni Research Foundation for emission spectrographic analysis. The results are presented in Table 10 and represent the nutrient supplying power of the surface 4 inches of soil at each sample site. From these data the concentration of each element in the rye seedlings is plotted against the sample site locations to illustrate more clearly the variability in the soils from different locations to supply that particular nutrient based on its uptake by the rye seedlings.

The horizontal dotted line on each graph represents the concentration of that particular element in the check plants which were grown in pure sand. It is interesting to note that in some instances the concentration of a particular element in the rye seedlings was less than in the check plants for a particular soil. Since the sand was relatively free of any available nutrients, those which were present in the plant tissue came largely from the seed itself. Thus, for the plants growing on the soil cultures to have a lower concentration of a particular nutrient than the check plants would suggest a possible outward diffusion of that nutrient from the plants during the period of growth. Whatever the explanation might be it does indicate that the ability of the soil to supply that particular nutrient is very low. This phenomenon presents some very interesting questions that would be interesting to pursue further if time and funds permitted.

A series of photographs illustrating the method of growing the seedlings and their general appearance just prior to harvesting are illustrated in Figures 51, 52, 53 and 54.

Uptake of Nutrient Elements by Native Plants Observation of the plants growing in the vicinity of each sample pit indicated that New Mexico locust (Robinia neo-mexicana) and bracken fern (Pteridium aquilinum) were common to more sample sites than any other plant species. In order to compare the supplying power of the soil at the various sample sites for specific nutrients it was important that the same species of plants be used as indicators. The first fully mature leaves of the locust were sampled from several plants growing in the immediate vicinity of the sample pit. Similarly, the first fully expanded leaves of the bracken fern were collected. These leaf samples from each species were composited, dried, ground and submitted to the Wisconsin Alumni Research Foundation for emission spectrographic analysis.

The elemental concentration of selected elements in the leaves of the New Mexico locust and bracken fern are presented in Table 11. In order to illustrate more clearly the variability in elemental concentrations of a given element at the different sample sites these data were plotted in a series of graphs. By comparing the curves for a specific element concentration in either of the two plant species, the supplying power of the soil for that element on all three drainages can be compared. This procedure for determining the ability of plants to extract nutrients from the soil can be adapted to a large number of different plant species and might well afford a simple and inexpensive method of evaluating changes in the nutrient status of a particular soil as a result of changes in vegetative composition or other management practices imposed upon a given area.

Long Term Soil Moisture Data Continuous weekly determinations of the moisture content of the soils in 15 cm increments of depth have been obtained at the Waterways Experiment Station sample sites begining 3 November 1967. All determinations were made gravimetrically. A large number of curves could be generated from this data to show the changes in soil moisture content with depth and with time. This may have value as related to current or to future studies in the areas where these sites were located. These data are presented in Table 12.

Erosion Study with Fluorescent Sand Consideration was given to the problem of soil movement on the surface as a result of the change in vegetation on the north and south forks of Workman Creek. A report by Russell [1] on the use of fluorescent tracers for the measurement of littoral drift of beach sands stimulated the idea that this technique might also be used to estimate the degree to which surface soil particles move and their direction following rain showers.

The procedure used consisted of mixing a thin solution of vinylite resin and acetone with a few grams of anthracene or rhodamine B. A half-gallon of coarse silica sand was then placed in a large plastic bucket and moistened with the vinylite solution and thoroughly mixed. The sand was then spread out in a thin layer on a sheet of plastic and allowed to dry after which it was easily broken into individual sand grains by sieving through a coarse sieve. Each grain of the sand was coated with the resin containing fluorescent material. Under ultra-violet radiation the anthracene fluoresces green and the rhodamine fluoresces pink. Several lines of this fluorescent sand were laid out on 30 June 1068 as illustrated in Figure 46. These lines of fluorescent-coated sand were established on the three drainages of upper Workman Creek and in two locations near the base-rock lysimeters.

A portable fluorescent lamp powered from a 12-volt automobile battery was constructed by Mr. Robert T. Dickie of Arizona State University Physics Department. At night this lamp caused the grains of sand in the line to fluoresce brilliantly and is illustrated in Figure 47. This photograph was taken about midnight with the ultra-violet lamp as the only source of illumination.

The immediate objective of this study was to test the possibility of using this method to estimate the movement of surface soil particles following a rain shower. From initial observations it appears that this method has excellent possibilities for the movement of sand grains from the original line following shower activity could easily be detected as shown in Figure 48. However, the flucrescent quality of the coating deteriorated with time and after three months it was difficult to pick up the sand grains under ultra-violet illumination. By using crushed and graded naturally occurring fluorescent minerals this problem should be overcome. For short time studies the fluorescent sand prepared as described would be satisfactory.

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[1] Russell, R. C. H., The use of fluorescent tracers for the measurement of littoral drift, Hydraulics Research Station, Wallingford, England.

Nematode Studies During the summer of 1967 a graduate student, Mr. Omar M. Amin, was employed to assist in the collection of soil samples and other data. Mr. Amin had completed all requirements for his Ph.D. degree except for his final examination. He majored in Zoology specializing in nematology. In addition to other work he was given the specific assignment of studying the nematode populations in the soils at the various sample sites on the three drainages. He collected soils from the sites and working under the direction of Dr. Harold W. Reynolds at the Arizona Cotton Research Laboratory, he extracted and identified many different species of nematodes from the soil samples.

Several of the species of nematodes identified are known to be plant parasites and others are suspected to be plant parasites. Many species, however, are not known to affect living plants. Table 13 lists all the species of nematodes found, their location with respect to the sample sites and the depth of soil sample from which they were isolated.

Vegetation Studies During the summers of 1966 and 1967 Mrs. Alexandra Stockton undertook a special study of all plants growing within a 50 foot radius of each of the 17 sample sites. The objective of this study was to get an inventory of the plants growing around the sites at that time to serve as a reference record for the future. Plant specimens were collected and mounted in a permanent herbarium file consisting of two large ring-bound "volumes". A photographic record of most of the plants in this file is included in the last section of this report.

Fungi Studies During the last two weeks of August 1966 there was a prolific growth of many species of fungi in the three drainages of Workman Creek, particularly in the forested areas. Apparently the right combination of moisture and temperature conditions prevailed long enough for the fungi to develop. On 30 August 1966 collections were made of as many different species as could be found. The were placed in plastic bags and delivered in a fresh condition to Dr. Chester R. Leathers of the Arizona State University Botany Department who examined all specimens collected and was able to identify most of them as follows:

Amanita muscaria
Boletus edulis
Cantharellus floccosus
Tricholoma sp.
Clavaria stricta
Clavaria sp.
Pleurotus sp.
Clitocybe sp.
Mycena sp.
Cortinarius sp
Russula emetica
Amanita caesaria
Boletus aurantiocus

There were a few other species but it was not possible to identify them because the proper stages of development were not present.

ACKNOWLEDGMENTS

This study could not have been made without the loyal and dedicated work of several fine students who spent many long hours digging sample pits, collecting soil samples and plant samples, preparing these samples for analysis, completing the analyses, typing the tables and drawing the graphs, etc. For their services on the project grateful appreciation is expressed to the following students and others who worked on the project:

To Lloyd and Alexandra Stockton who accomplished the major portion of the work on the project. Lloyd dug all the sample pits and collected the soil samples while Alexandra recorded the notes and assisted in preparing the samples in the field. He also collected a majority of the 1-foot soil samples from each of the three drainages. Together they established the infiltrometers and obtained the infiltration data. In the laboratory they completed most of the analytical determinations. The vegetation survey and preparation of plant specimens and the preparation of the synthetic soil profiles were accomplished by Alexandra. Lloyd provided a saddle horse that was great help in carrying the large number of soil samples out of the forest to his pickup truck.

To Merrill Largent and Curtis B. Sherman who analyzed many of the soil samples when the study was first initiated.

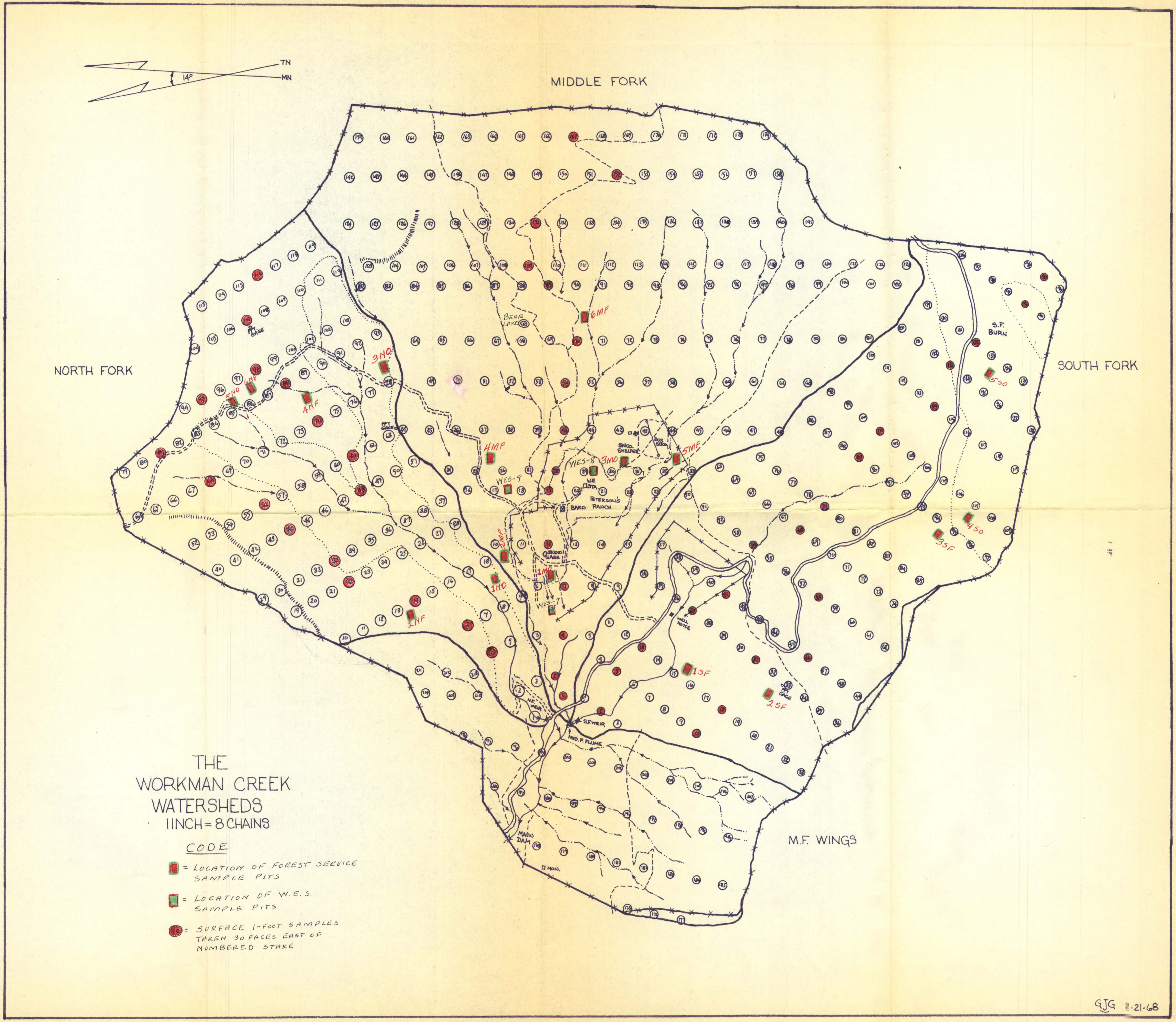
To Stephanie Farr who determined the colors of the soil samples in accordance with the Munsell notation.

To Clair Silvernale and Ronald Sell who completed the final analytical determinations on the soil samples after the Stocktons graduated and left the University.

To Omar M. Amin for his studies of the nematode population of the soils at the pit sample sites. To Ray Bigler for analytical determinations of particle size analysis.

To Linda Hallett and Joan Barrett for typing many of the tables and text of the this report.

Figure 0


TN
MN
14°
MIDDLE FORK
NORTH FORK
SOUTH FORK
M.F. WINGS
BEAR LAKE
S.F. BURN
3NO
6NF
5NO
4NF
4MF
WES-9
WES-8
3MO
SNO. SHELTER
5MF
6MF
WE STA.
PETERSON'S
BARD RANCH
2MF
3ND
1MO
SNOW GAGE
WES-7
2NF
WELL HOUSE
1SF
2SF
3SF
4SO
5SO
N.F. WEIR
S.F. WEIR
MID. F. FLUME
MAIN DAM
MON.

THE
WORKMAN CREEK WATERSHEDS

1 INCH = 8 CHAINS

CODE

🟩 = LOCATION OF FOREST SERVICE SAMPLE PITS

🟥 = LOCATION OF W.E.S. SAMPLE PITS

● = SURFACE 1-FOOT SAMPLES TAKEN 30 PACES EAST OF NUMBERED STAKE

GJG 8-21-68

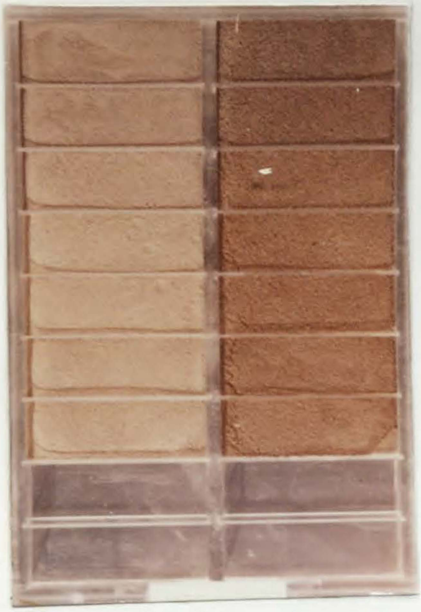


Fig. 1 North Fork Pit No. 1 in area clear cut in 1958

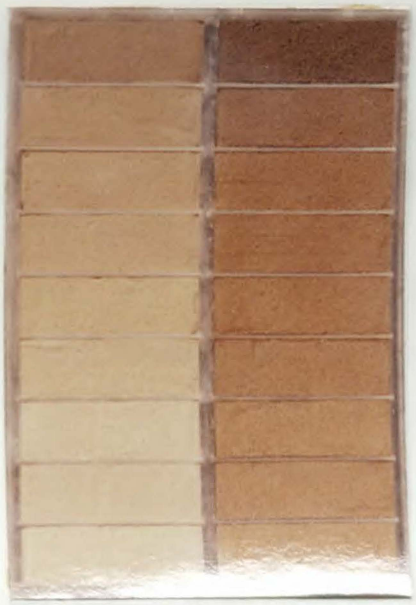


Fig 2. North Fork Pit No. 2 in forested area Merchantable cut in 1966

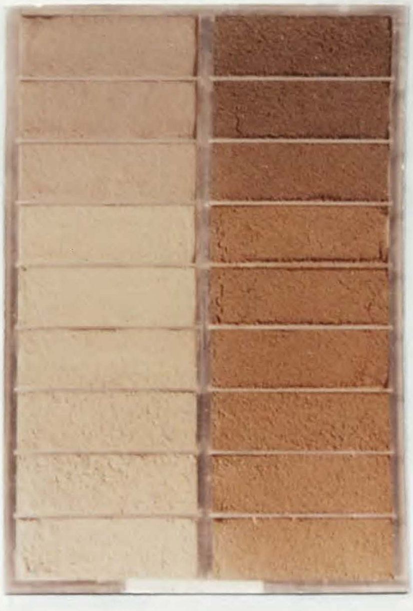


Fig. 3 North Fork Pit No. 3 in area clear cut in 1958

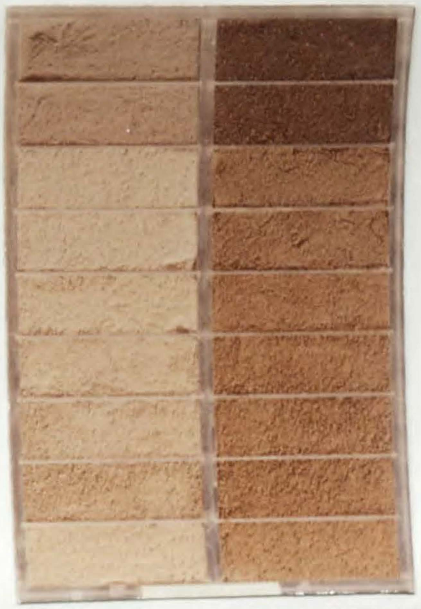


Fig. 4 North Fork Pit No. 4 in forested area Merchantable cut in 1966

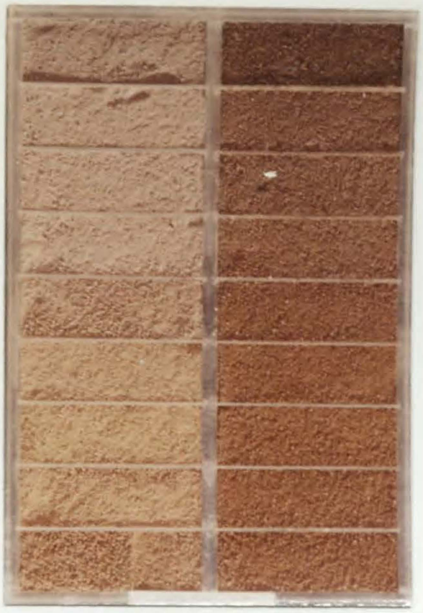


Fig. 5 North Fork Pit No. 5 in area clear cut in 1958

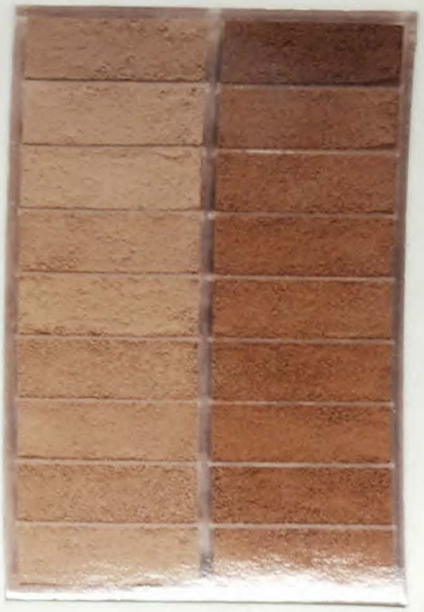


Fig. 6 North Fork Pit No. 6 in forested area Merchantable cut in 1966

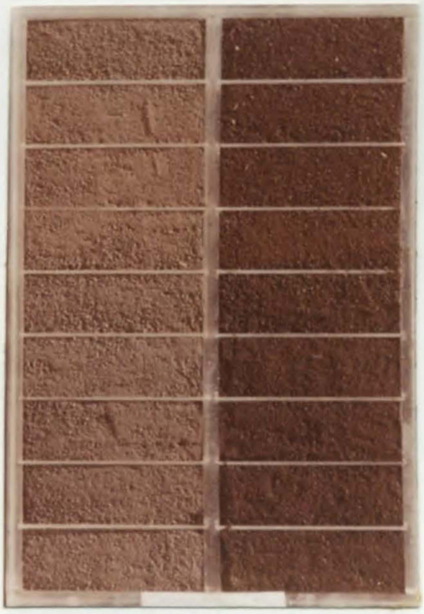


Fig. 7 Middle Fork Pit No. 1 in natural meadow West of Apple Orchard

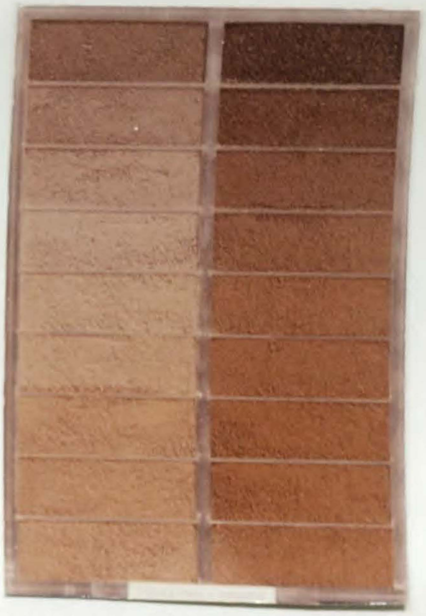


Fig. 8 Middle Fork Pit No. 2 in forested area North of lower meadow.

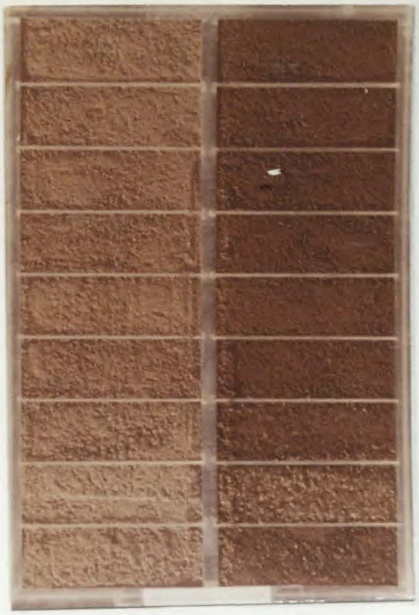


Fig. 9 Middle Fork Pit
No. 3 in center meadow

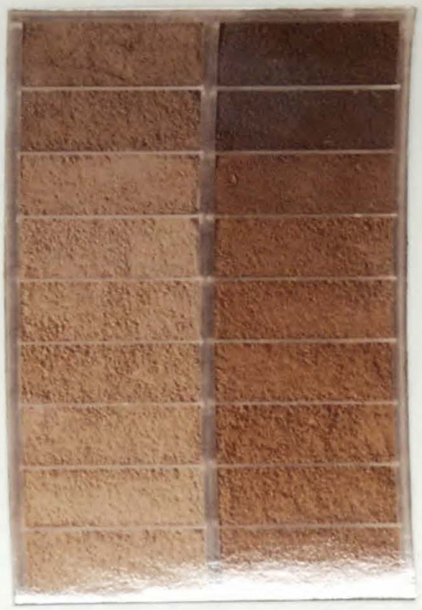


Fig. 10 Middle Fork Pit
No. 4 in forested area
North of ranch house site

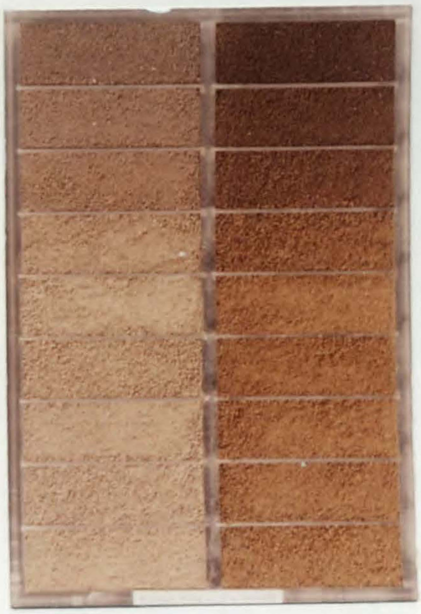


Fig. 11 Middle Fork Pit
No. 5 in forested area
West of upper meadow

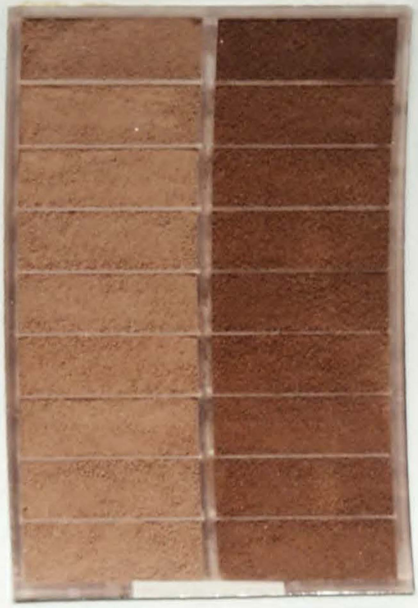


Fig. 12 Middle Fork Pit
No. 6 in forested area just
south of Bear Lake

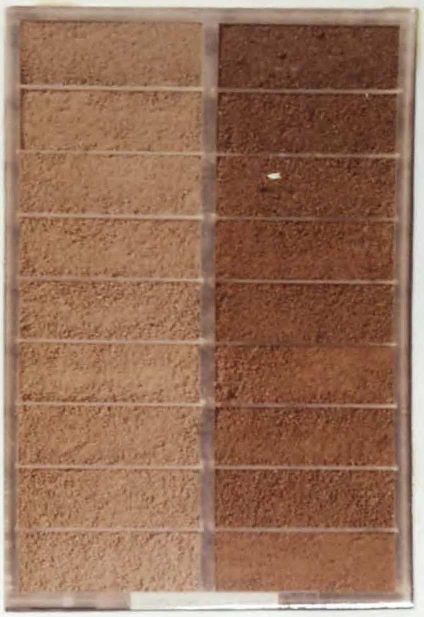


Fig. 13 South Fork Pit
No. 1 in forested area
clear cut in 1966.

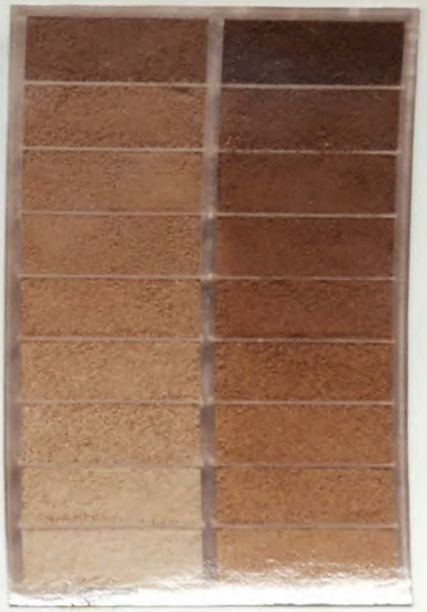


Fig. 14 South Fork Pit
No. 2 in forested area
clear cut in 1966

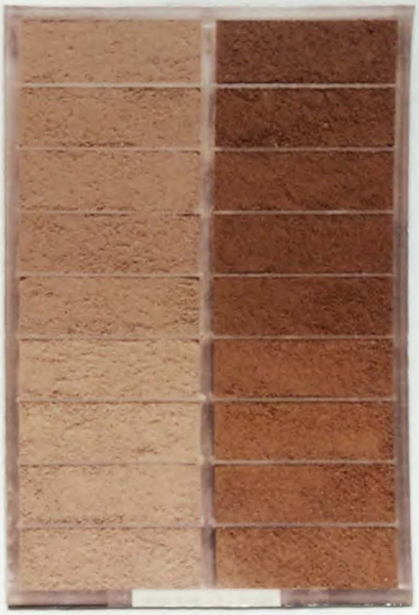


Fig. 15 South Fork Pit
No. 3 in forested area
just West of burn clear
cut in 1966

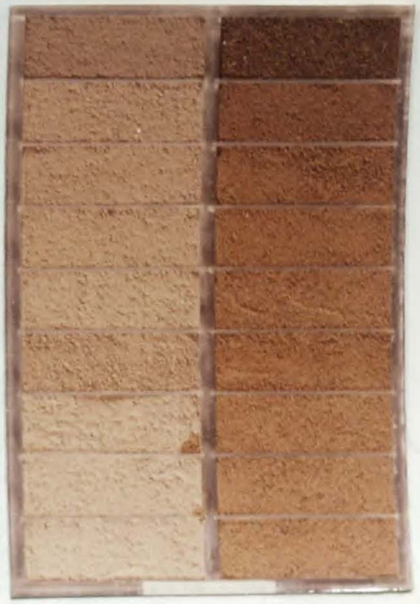


Fig. 16 South Fork Pit
No. 4 in burn area near
West side

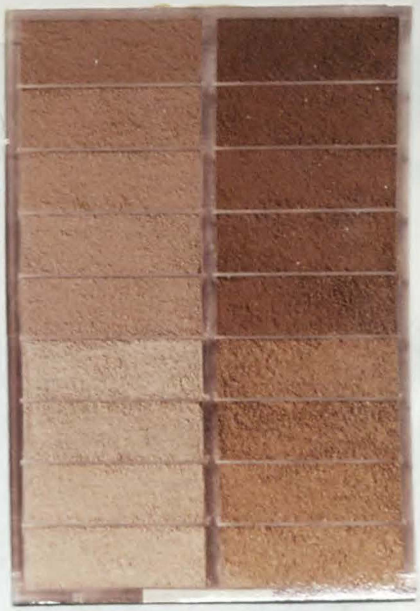


Fig. 17 South Fork Pit No. 5 in Southeast section of burn area.

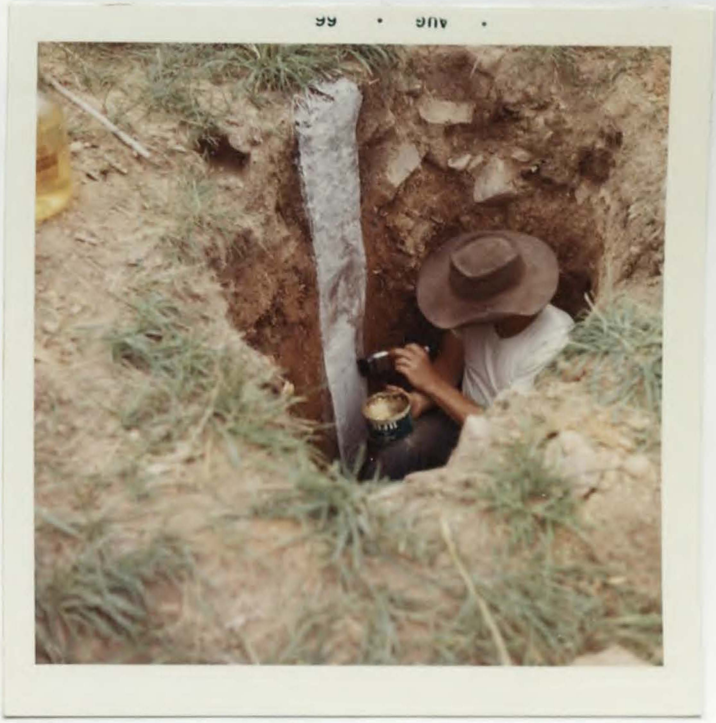


Fig. 18 Preparing an intact soil profile for removal. Pit No. 5 North Fork Research Assistant Lloyd M. Stockton.

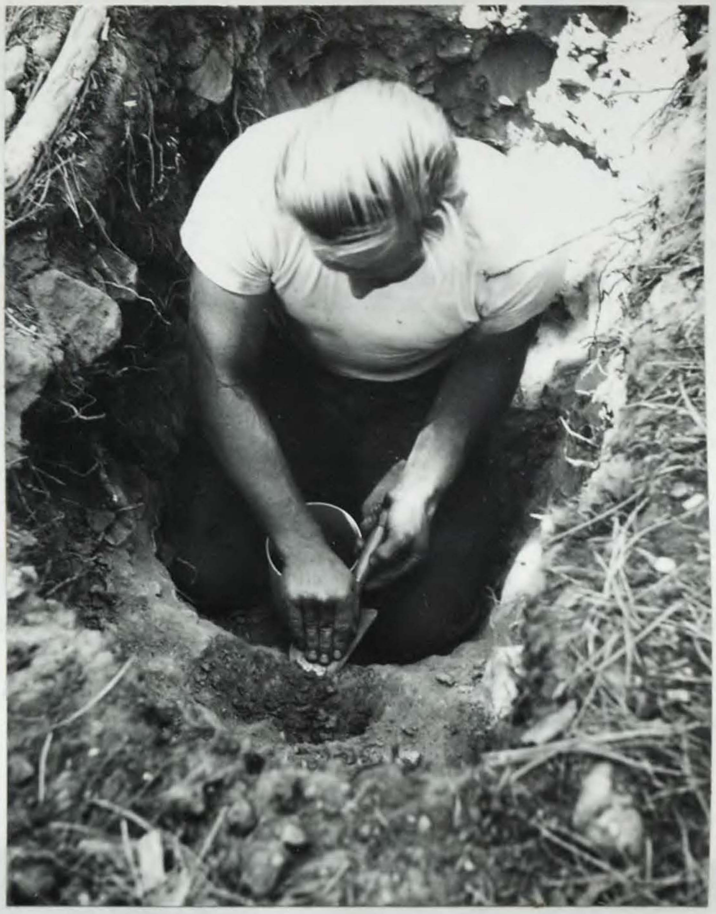


Fig. 19 Collecting Soil Sample from 4 inch depth increment in Pit No. 4 Middle Fork. Research Assistant Lloyd M. Stockton.

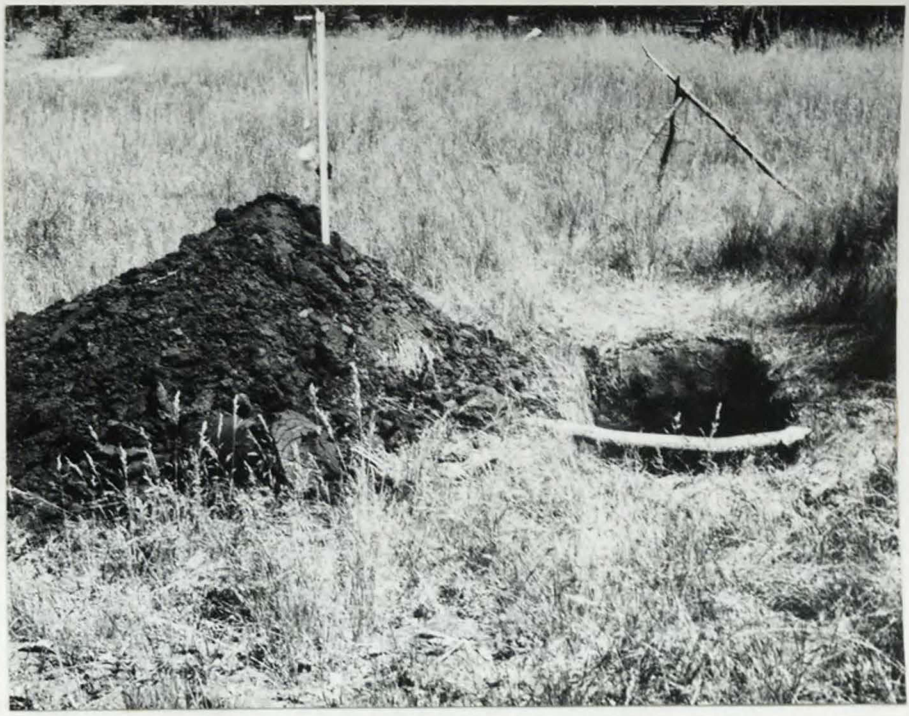


Fig. 20 Sample Pit No. 1 in Middle Fork lower meadow. One infiltrometer in background, another in bottom of Pit suspended from stick across Pit.

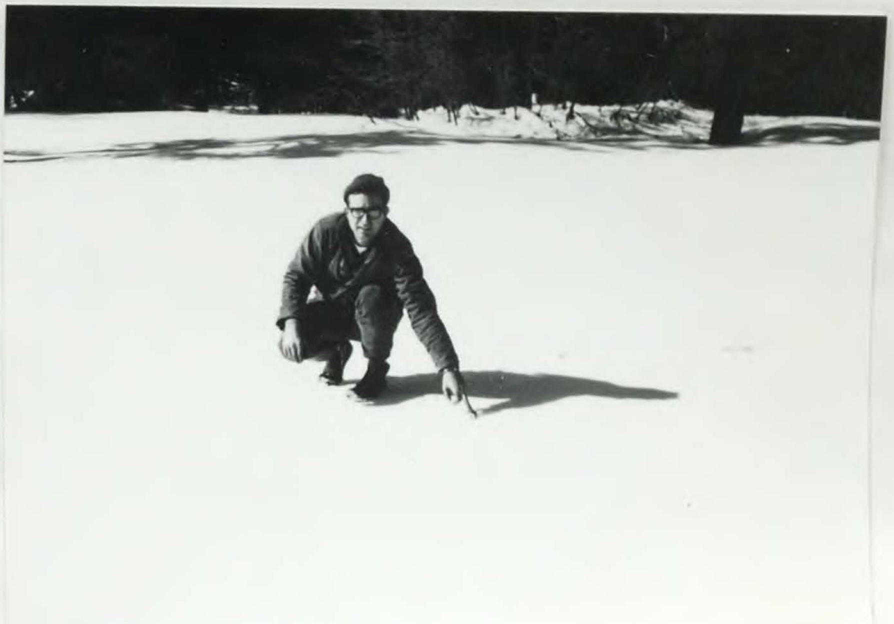


Fig. 21 Sample Pit No. 1 in Middle Fork after Heavy Snowfall of January 1968 Clair Silvernale Pointing to top of 6 ft. fence post marking site of Pit.

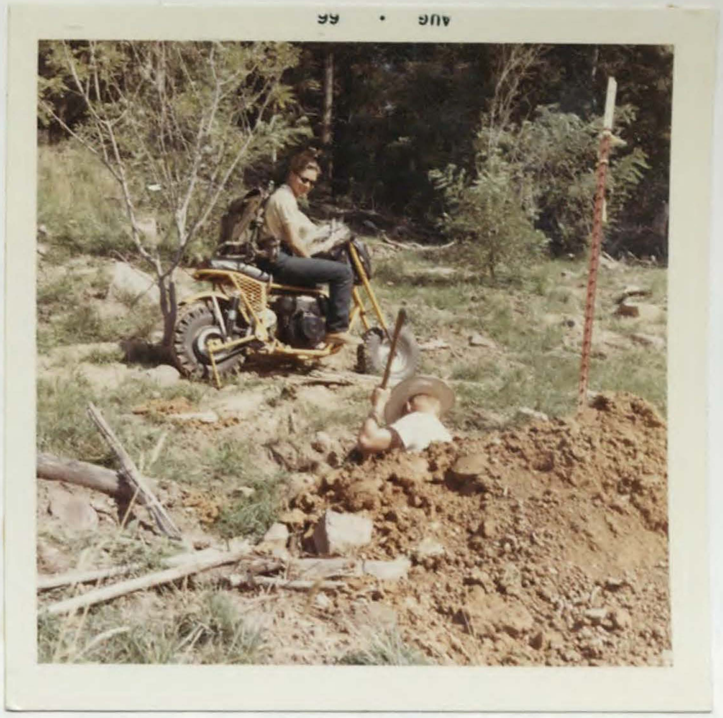


Fig. 22. Lloyd M. Stockton digging pit No. 3 on North Fork assisted by Alexandra Stockton.

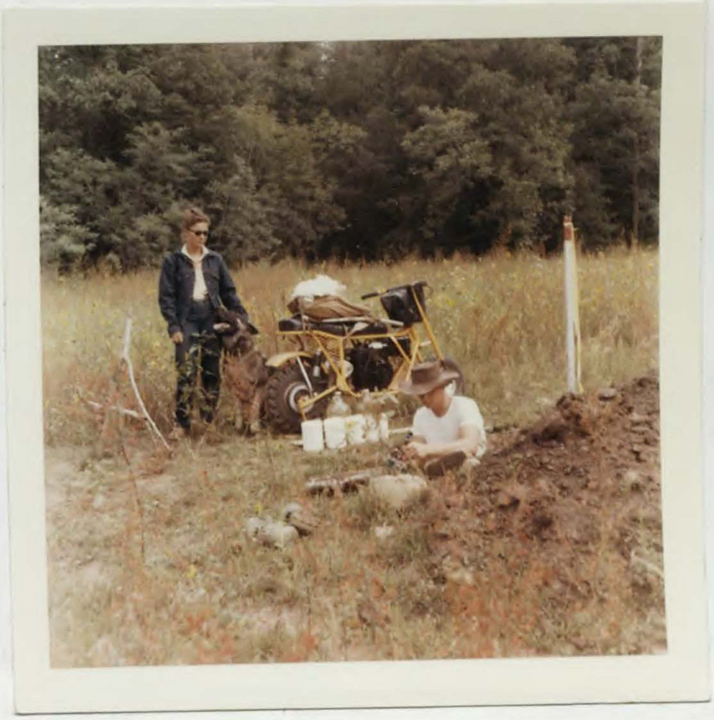


Fig. 23. Lloyd and Alexandra Stockton collecting soil samples from pit No. 3 in Upper Meadow of Middle Fork.

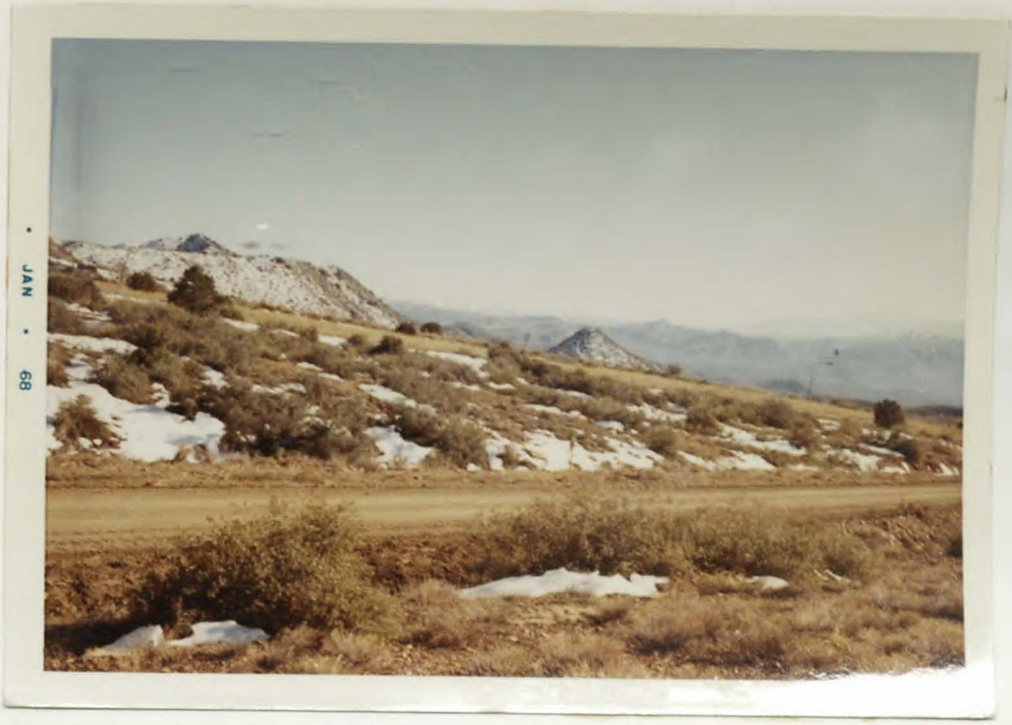


Fig. 24. Remains of heavy snowfall of mid-December 1967 after one month. View to southeast from vicinity of base rock lysimeters south of Sierra Ancha Headquarters.

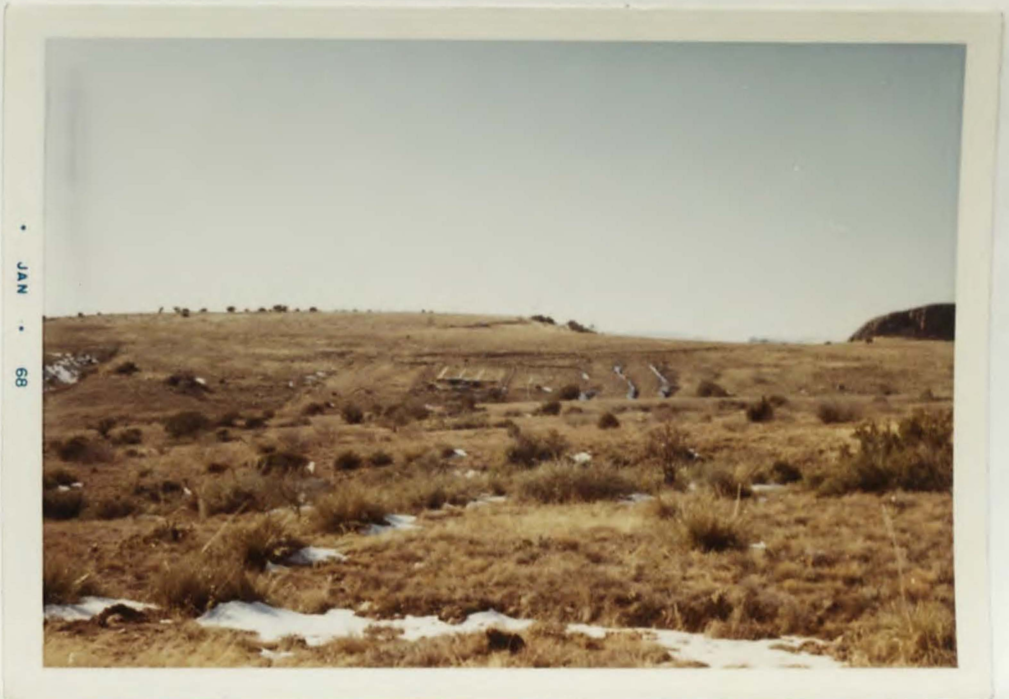


Fig. 25. View from same location as above but looking west to base rock lysimeters.

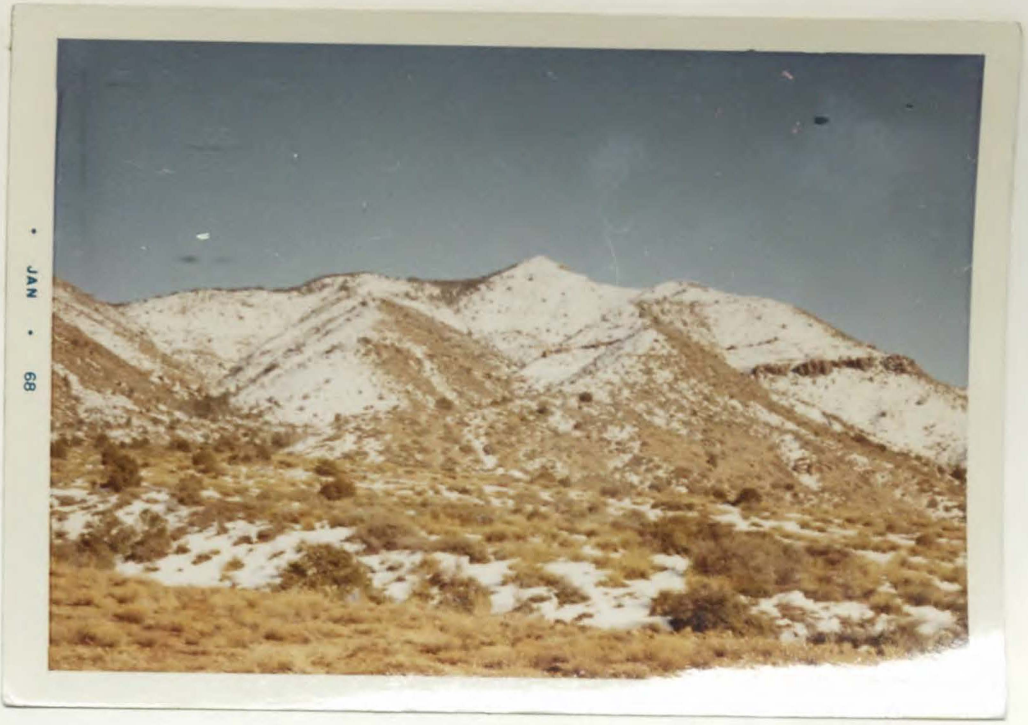


Fig. 26. View eastward to Asbestos Peak from main road due east of Base Rock lysimeters, 27 December, 1967.

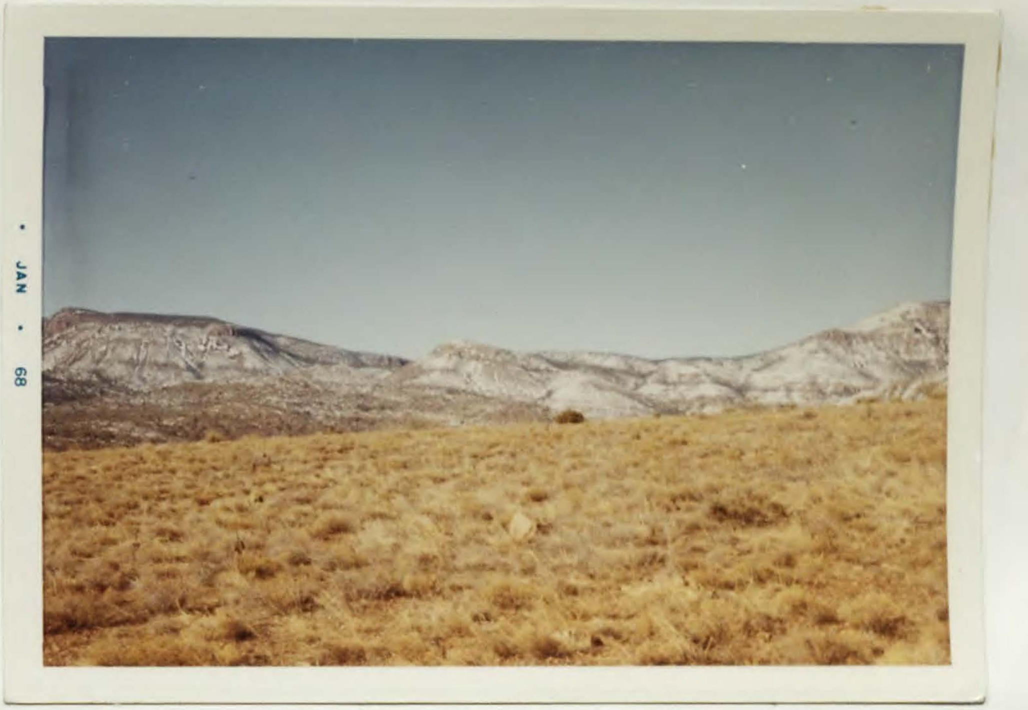


Fig. 27. View to north from same location as photo above, 27 December, 1967.

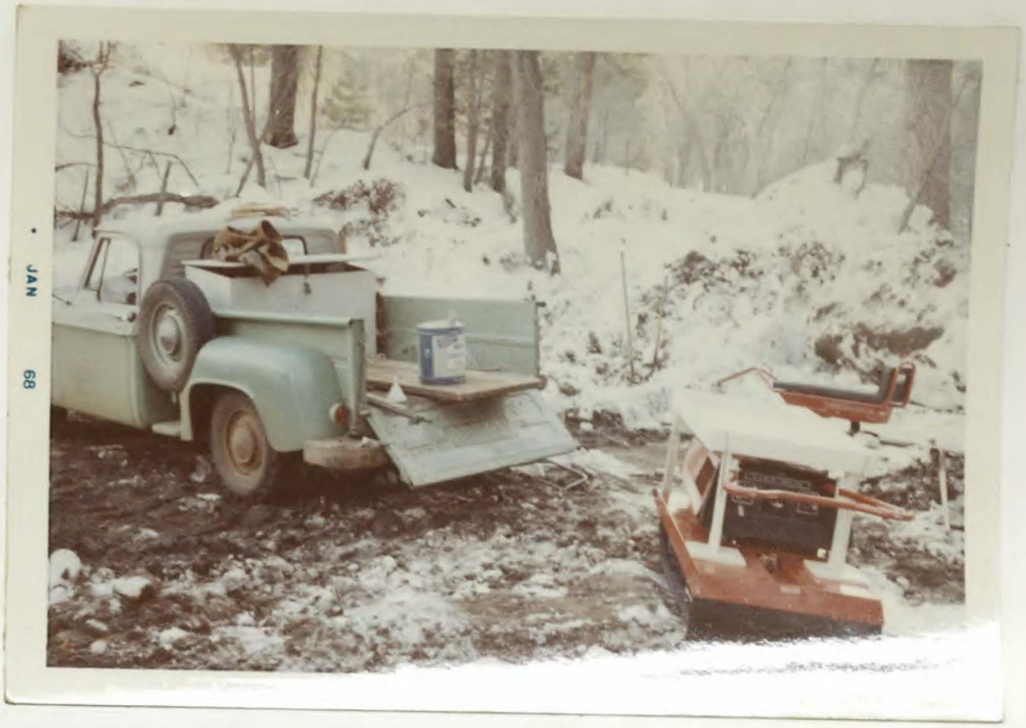


Fig. 28. Road cleared to YMCA Camp on Workman Creek. Snow was 6 feet deep on road beyond. Photo taken 27 December, 1967.

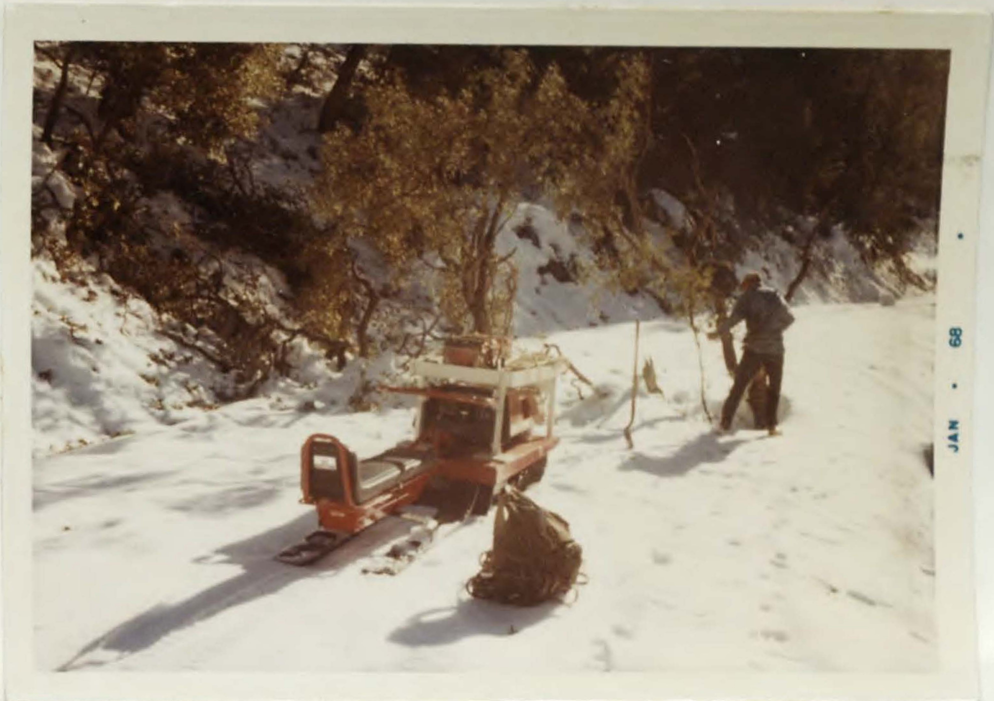


Fig. 29. Valden Chamberlain clearing fallen trees on Workman Creek road after heavy snowfall, 27 December, 1967.

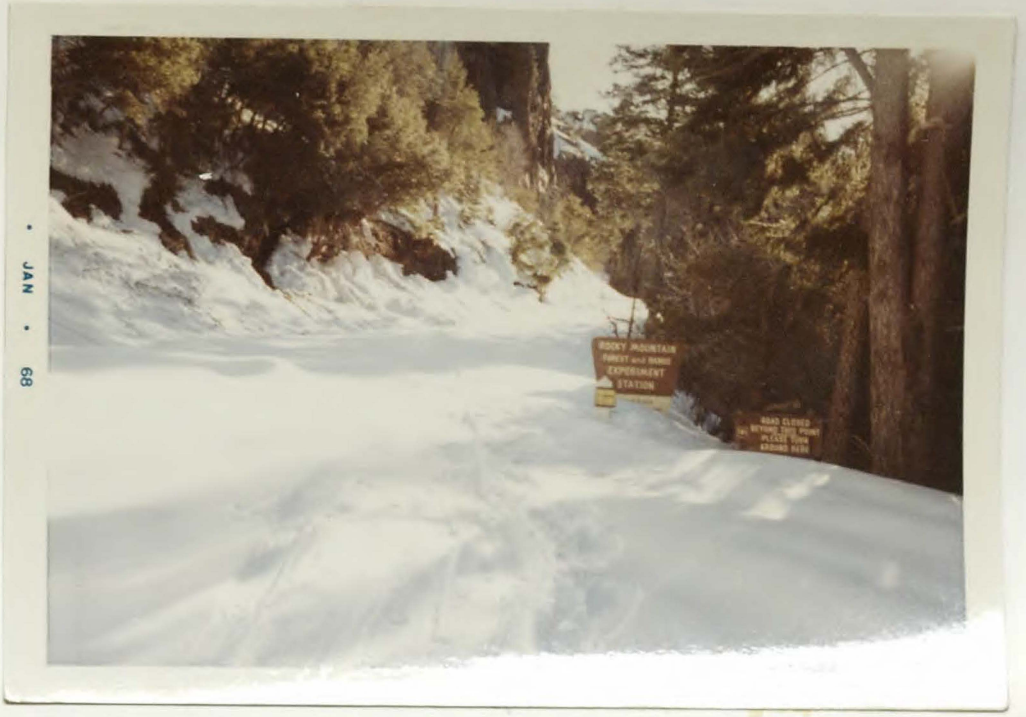

ROCKY MOUNTAIN
FOREST and RANGE
EXPERIMENT
STATION
ROAD CLOSED
BEYOND THIS POINT
PLEASE TURN
AROUND HERE
• JAN • 68

Fig. 30. Entrance gate below waterfall on Workman Creek Road, 27 December 1967.

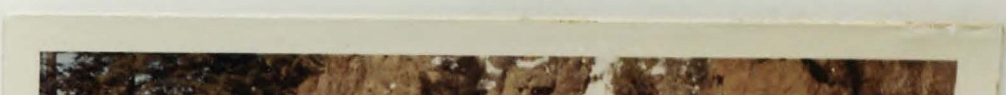


Fig. 31. Valden Chamberlain clearing path for snowmobile around waterfall on Workman Creek Road, 27 December, 1967.

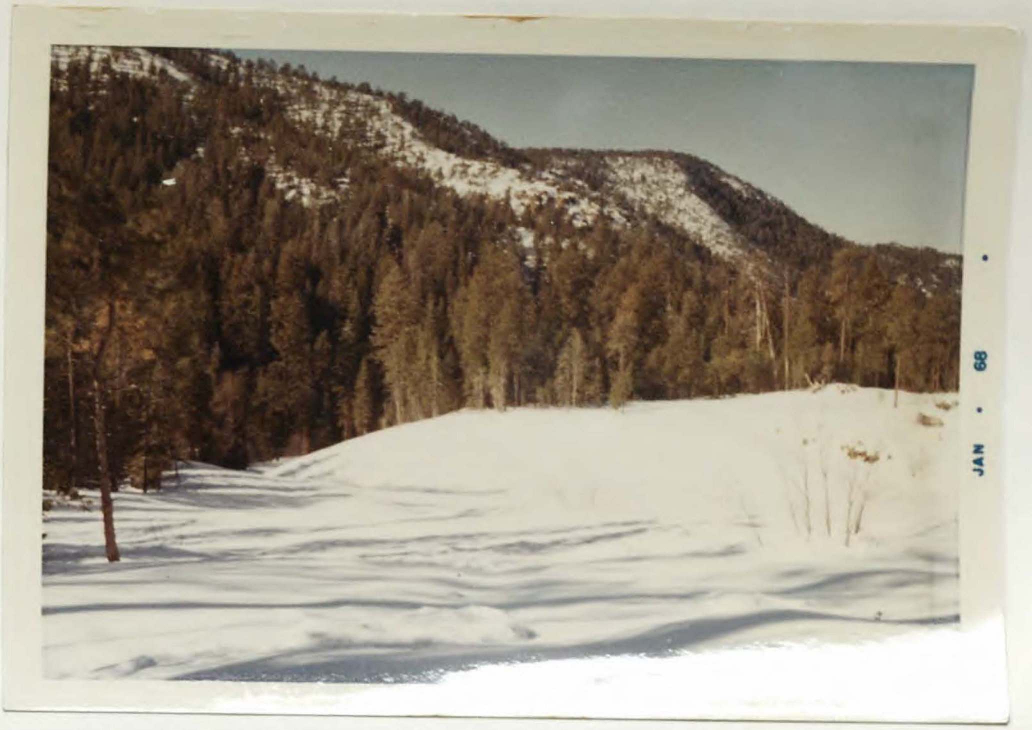


Fig. 32. North Fork of Workman Creek. View to southwest toward weirs, 27 December, 1967.

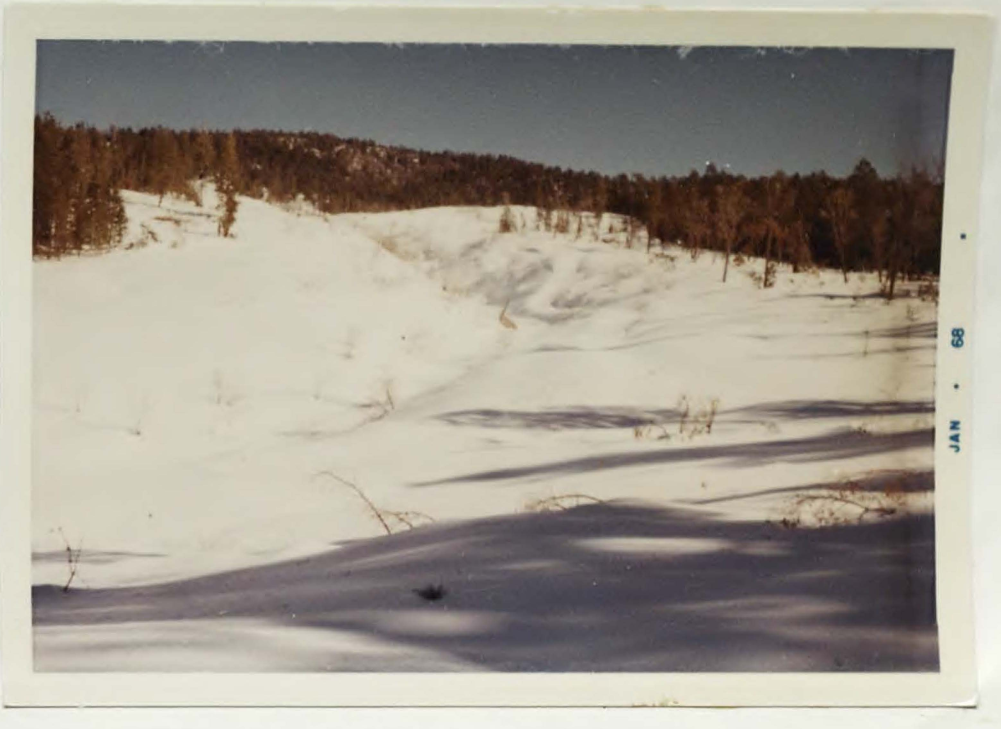


Fig. 33. North Fork of Workman Creek. View eastward toward Aztec Peak, 27 December, 1967.

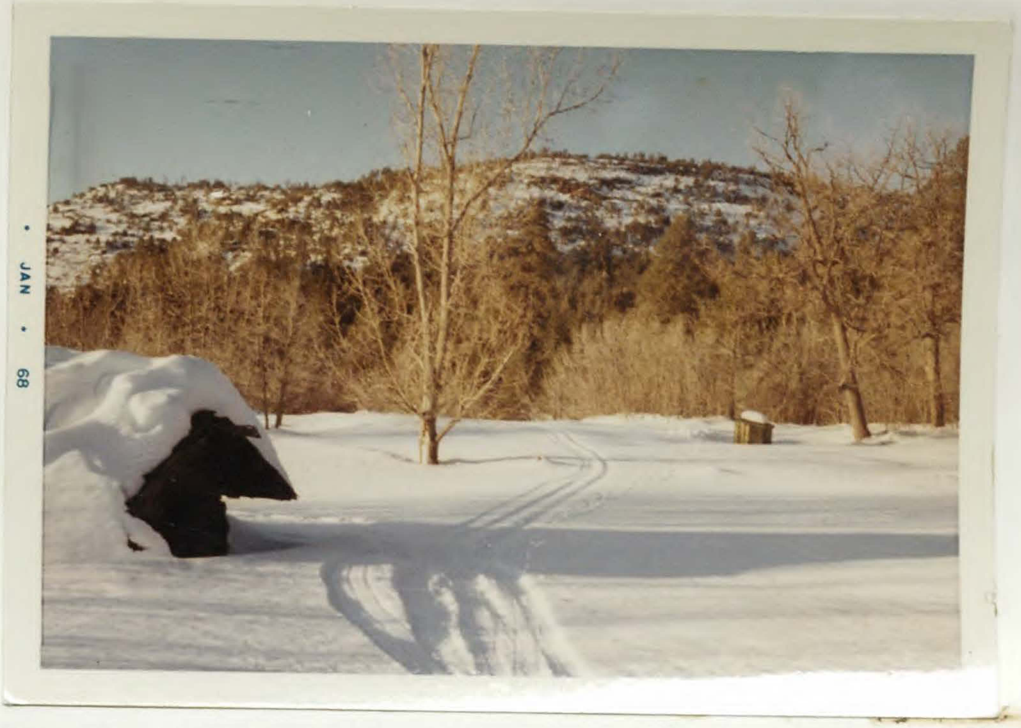


Fig. 34. Old log cabin at Peterson Ranch with instrument shelter center right, 27 December, 1967.

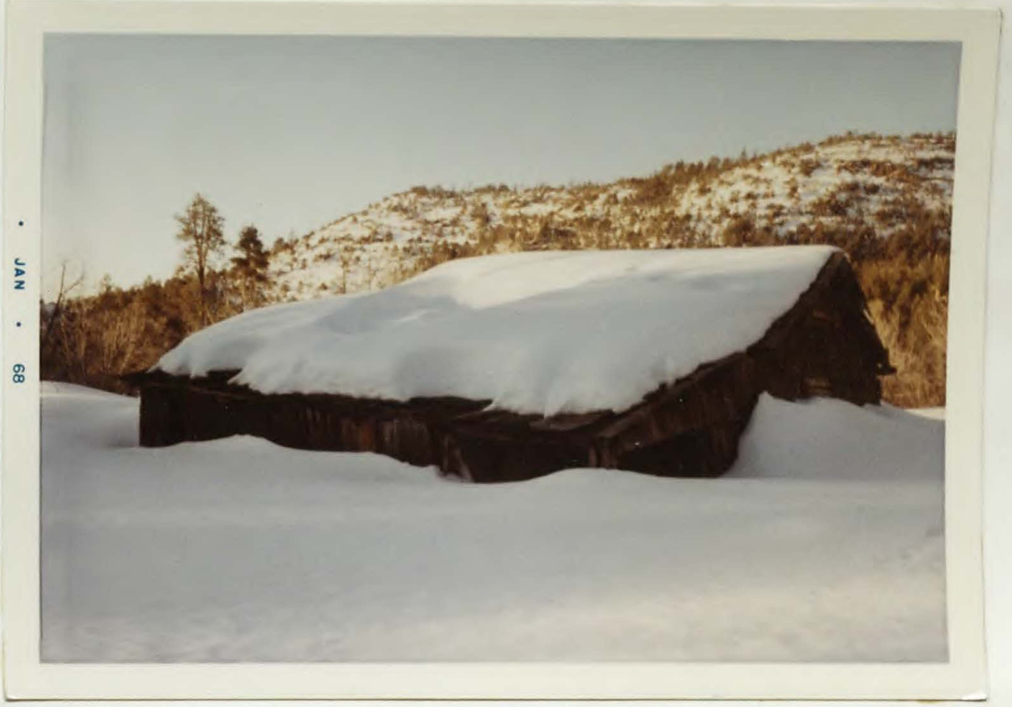


Fig. 35. Old barn at Peterson Ranch, Upper Workman Creek, 27 December, 1967.

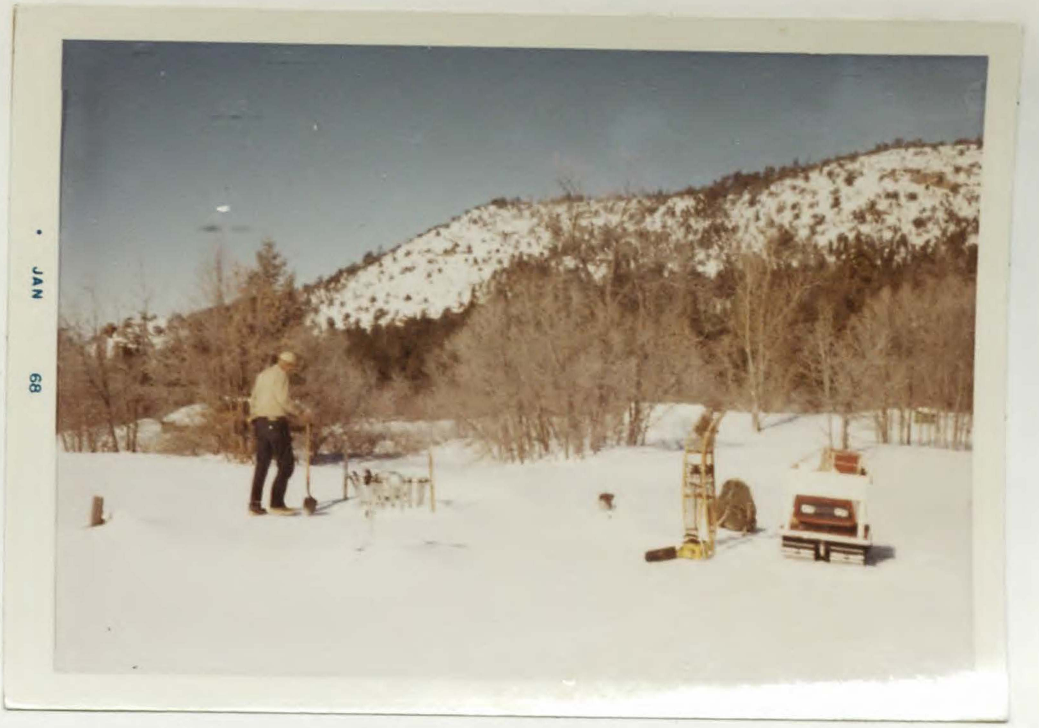


Fig. 36. Valden Chamberlain at weather station in Peterson Ranch Meadow. Anemometer and precipitation guage are the only instruments above the snow, 27 December, 1967.

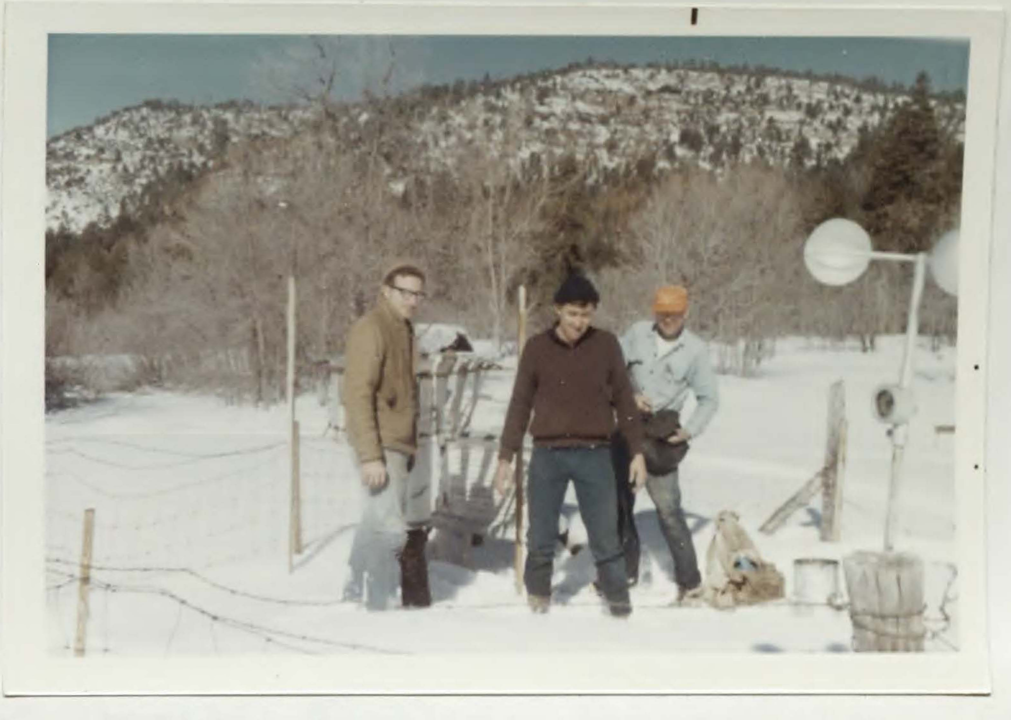


Fig. 37. Clair E. Silvernale, C. Ronald Sell and Valden Chamberlain at same location as above one year later, 31 December, 1968.

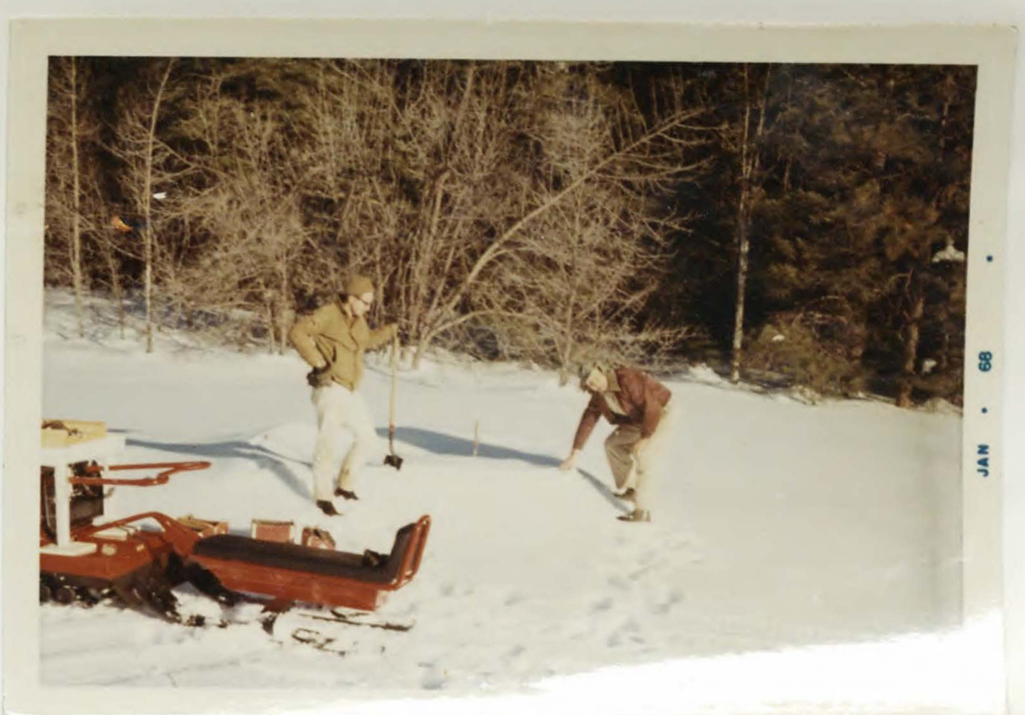


Fig. 38. Waterways Experiment Station sample site No. 8 about 350 feet east of weather station shown in Fig. 36. Note 6 foot fence and posts completely covered. Tip of light sensor pole is 2 meters above ground. Clair E. Silvernale left and Dr. Thomas W. Barrett, right, 27 December, 1967.

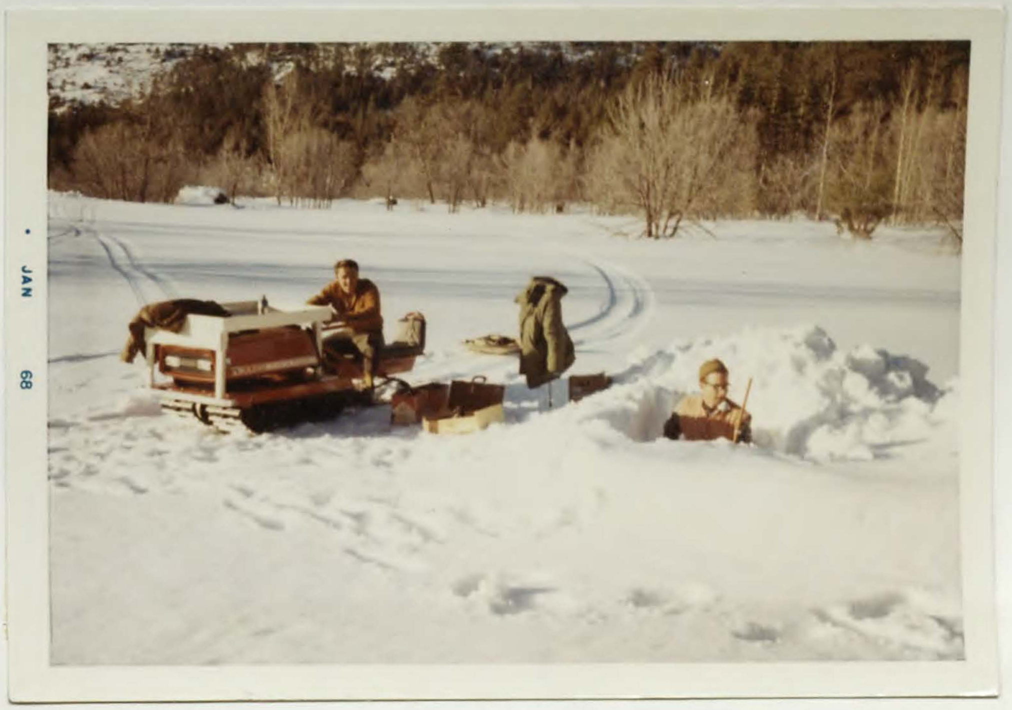


Fig. 39. Digging out instruments at W.E.S. site No. 8. Research assistants, C. Ronald Sell and Clair E. Silvernale, 27 December, 1967.

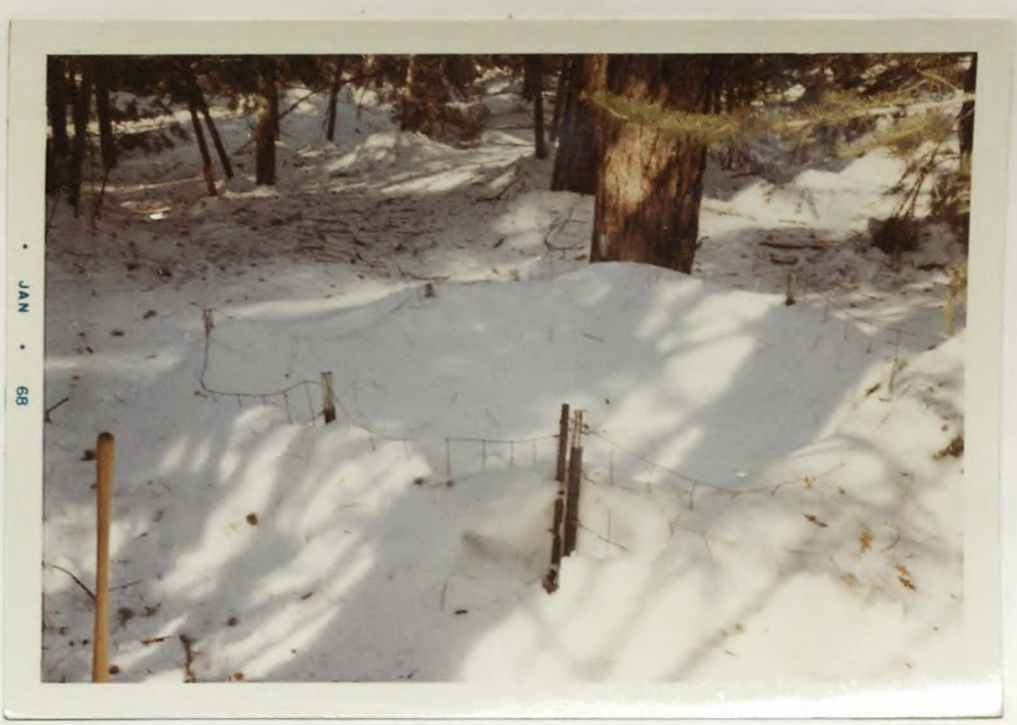


Fig. 40. Waterways Experiment Station sample site No. 7, 350 feet west of entrance road to Peterson Meadow on Middle Fork base survey line. Note top of fence posts are 6 feet above ground, 27 December, 1967.

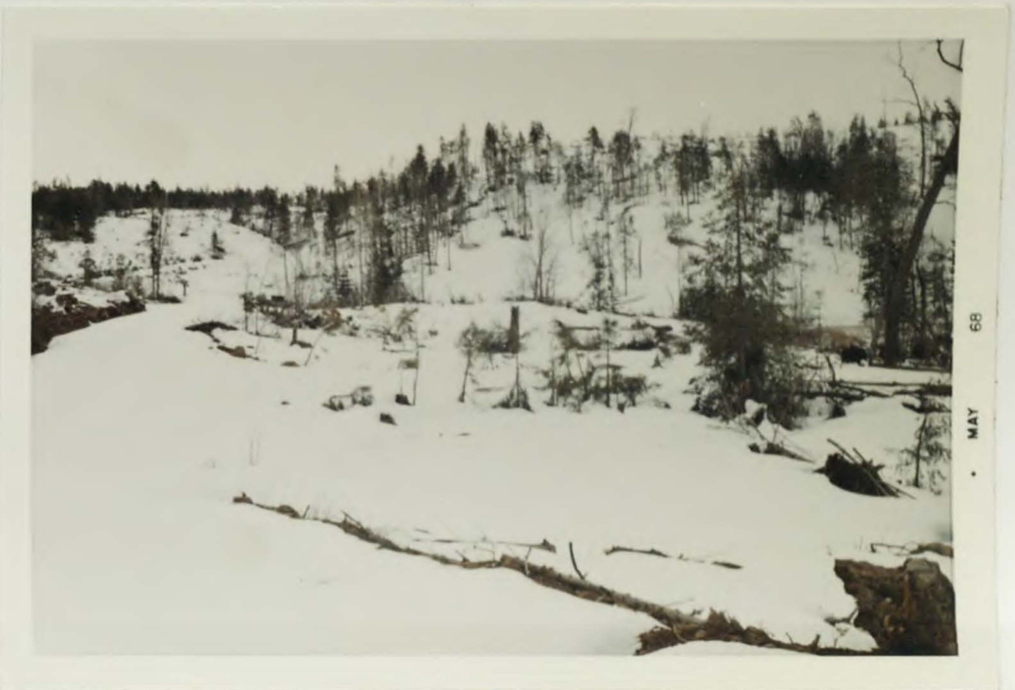


Fig. 41. South Fork of Workman Creek looking south from entrance road to Middle Fork, 27 April, 1968.

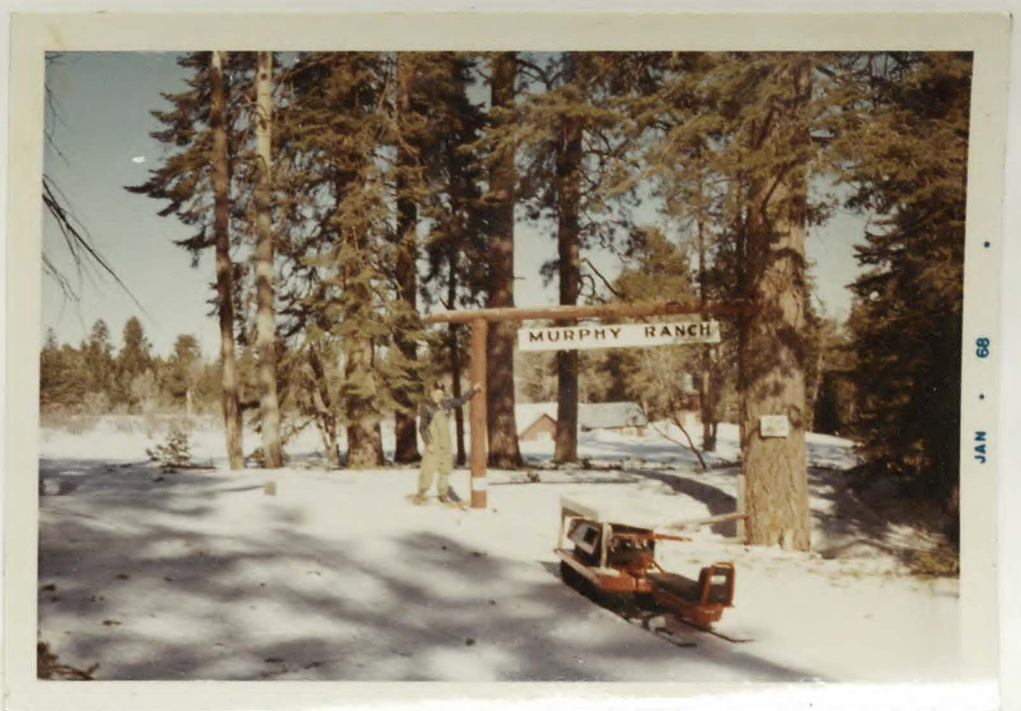

MURPHY RANCH
JAN • 68 •

Fig. 42. Cliff Edwards at entrance gate to Murphy Ranch. Note gate and fence completely covered, 27 December, 1967.

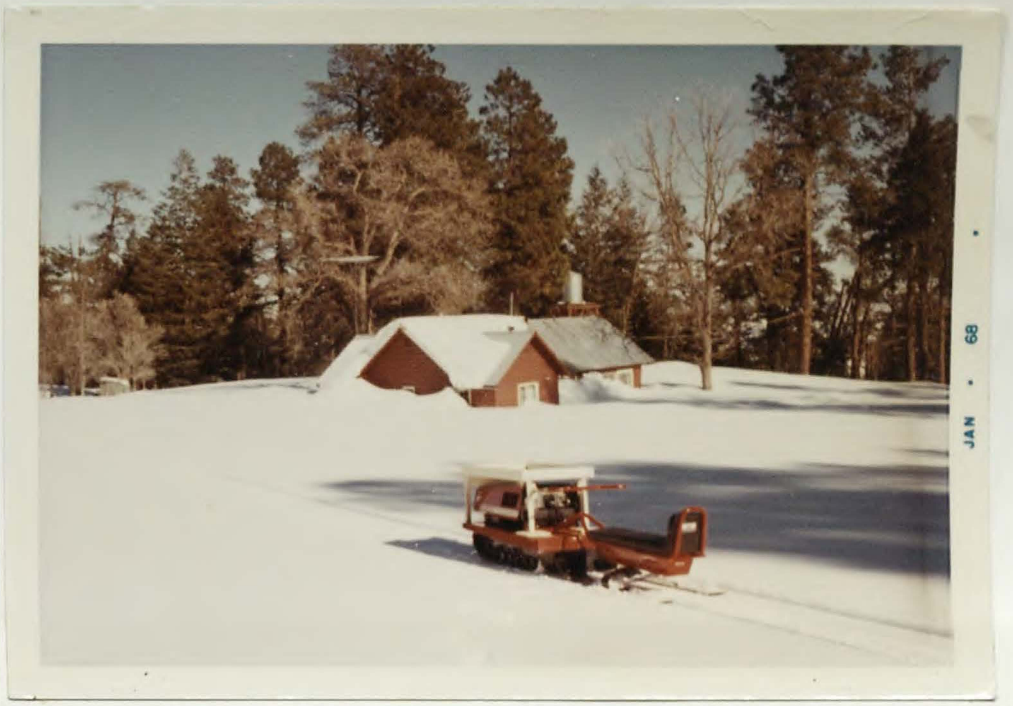


Fig. 43. Murphy Ranch house after heavy snowfall of December, 1967.

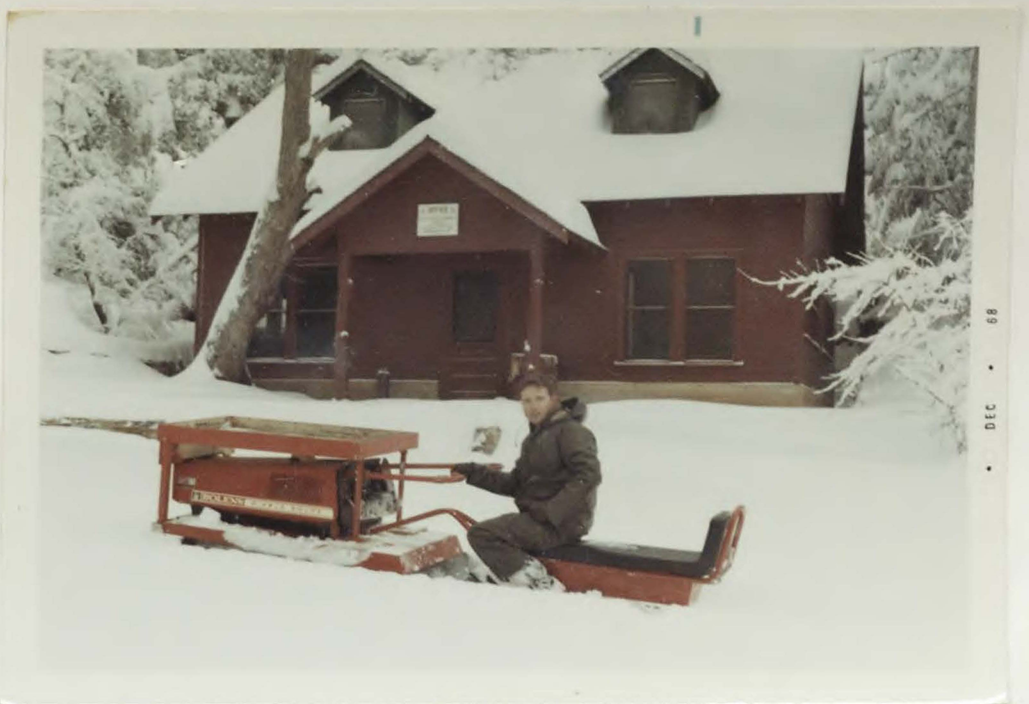


Fig. 44. Clair E. Silvernale in front of Sierra Ancha office building on morning following snowfall of 21 December, 1968.

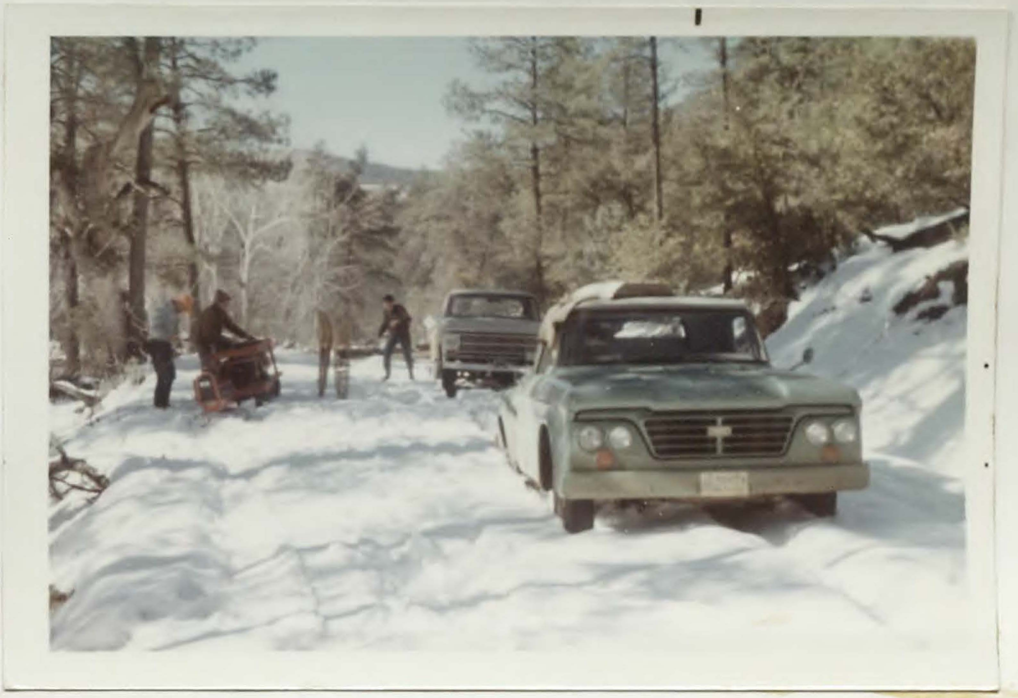


Fig. 45. Valden Chamberlain, Clair E. Silvernale and C. Ronald Sell at junction of Workman Creek and Young Roads, 31 December, 1968.

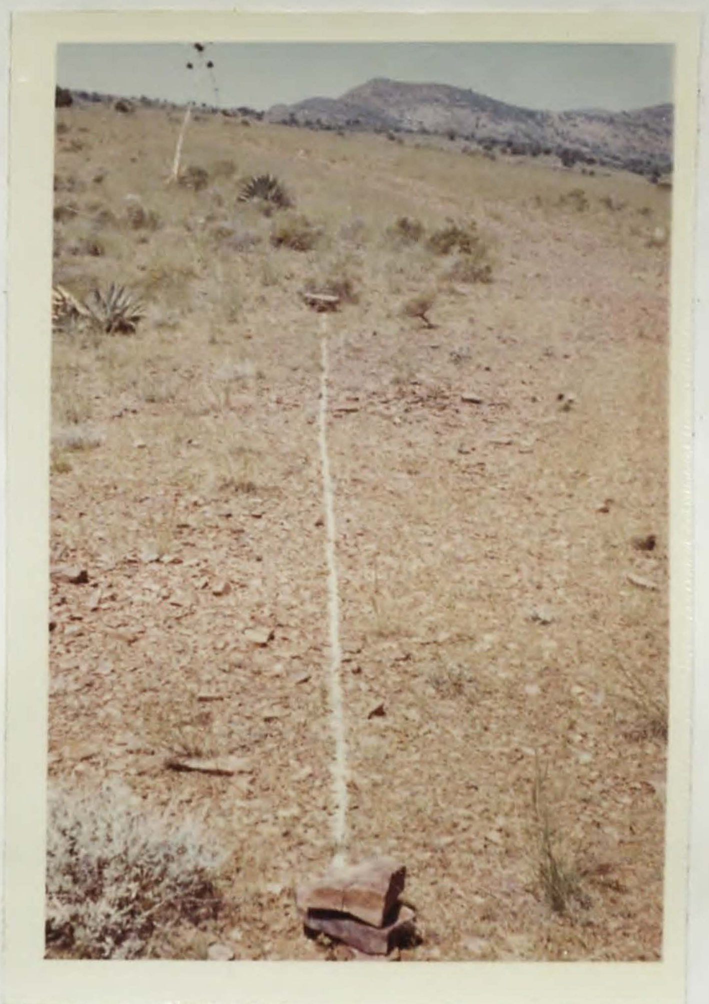


Fig. 46. Line of fluorescent sand east of base rock lysimeters and due west of W.E.S. Site No. 4. This sand is a mixture of rhodamine and anthracene coated sands. Line applied 30 June, 1968.

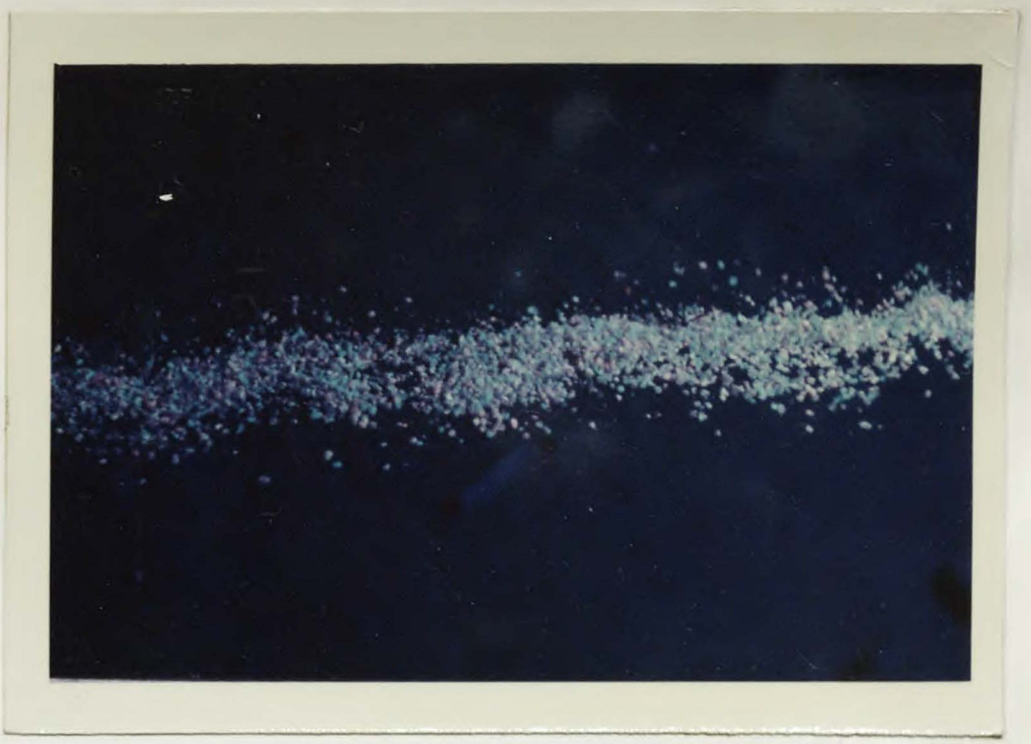


Fig. 47. Similar line of sand as in Fig. 46 photographed at night using ultra violet light for illumination. Anthracene coated sand grains fluoresce green while Rhodamine coated grains are pink, 30 June, 1968

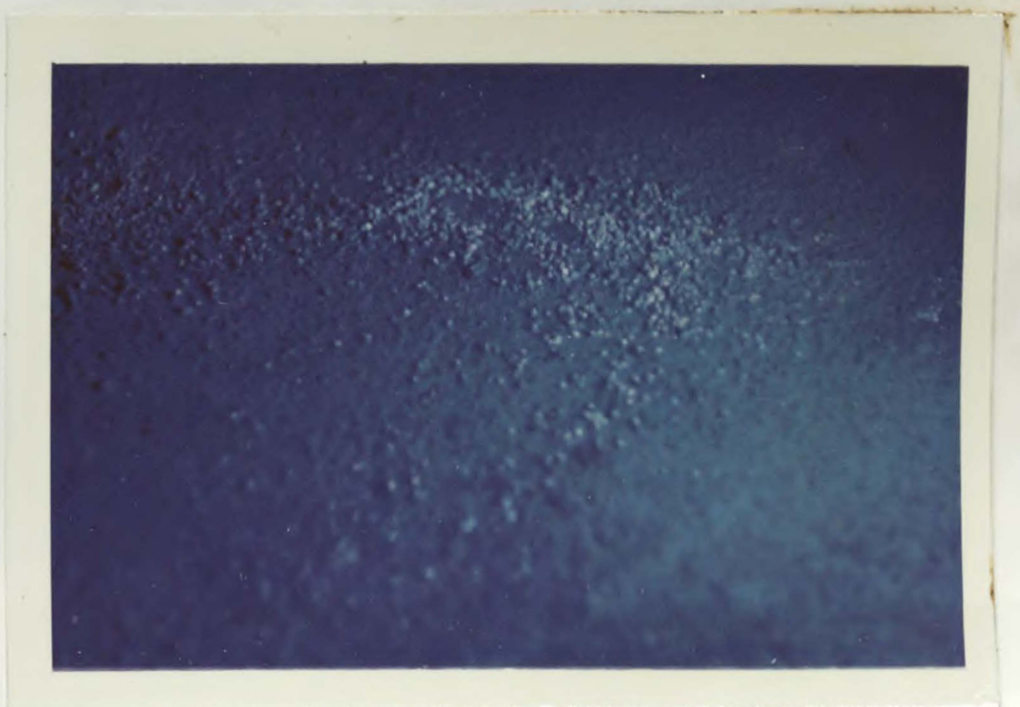


Fig. 48. Same line as is photo above. Picture taken one month later after several showers, 30 August, 1968.

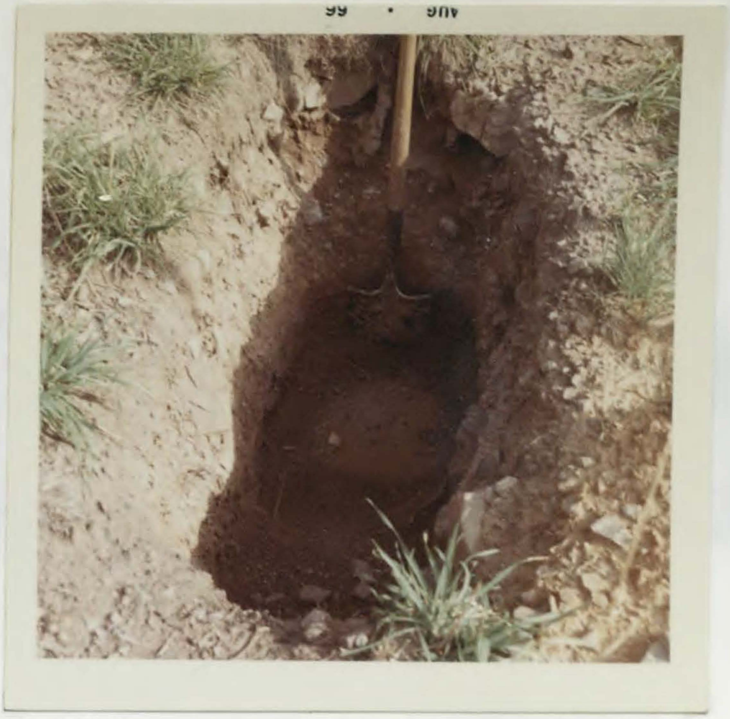


Fig. 49 Sample pit 1-NO as it appeared two weeks after being dug. This pit was located near the lone pine tree in the right foreground of the picture below.

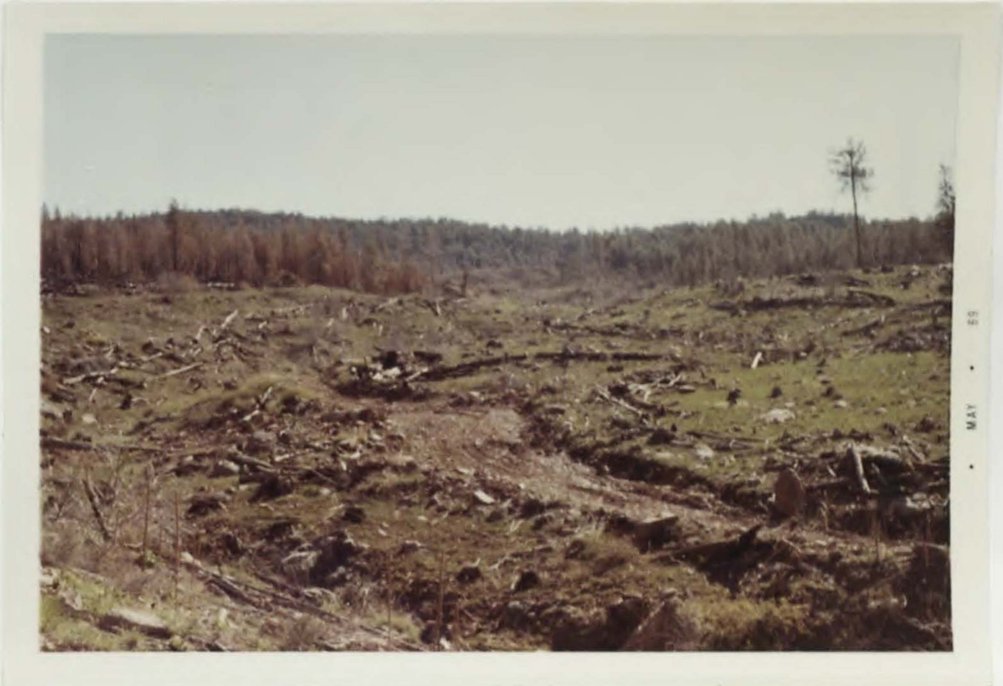


Fig. 50 This is a view of the North Fork of Workman Creek as it appeared on 10 May 1969.

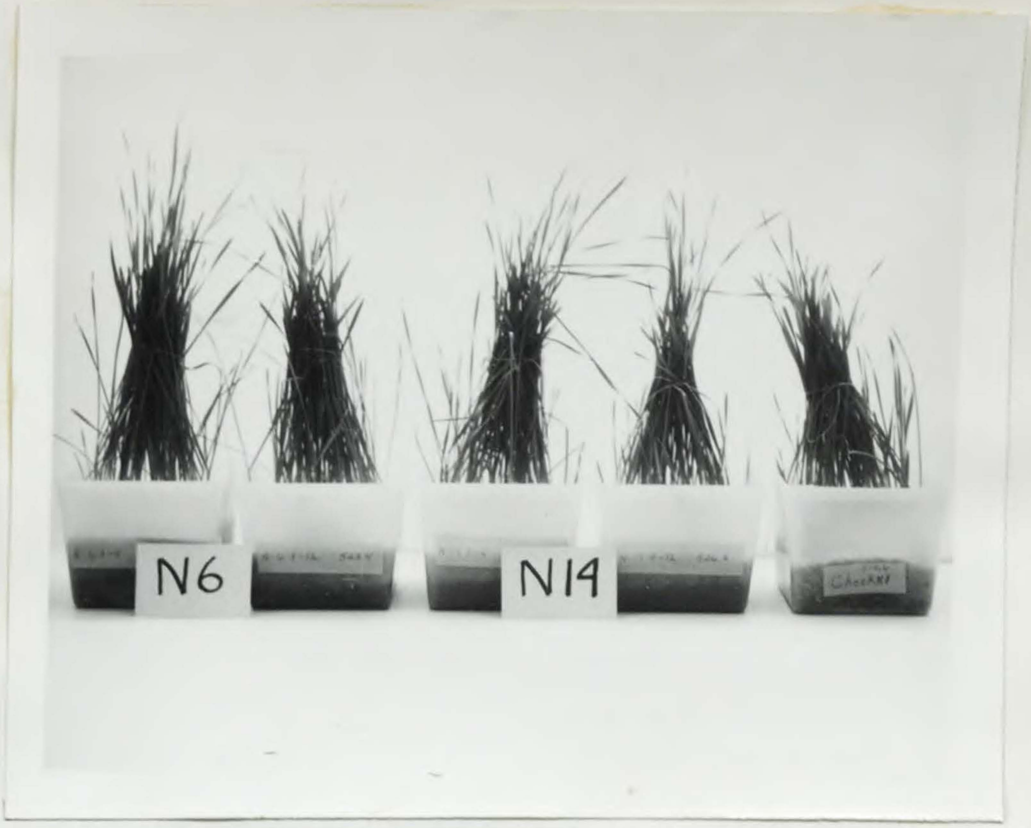


Fig. 51 Neubauer test showing rye seedlings growing in soils from 0 - 4 and 8 - 12 inch depths from two sample sites. Check plants in last container on the right side.

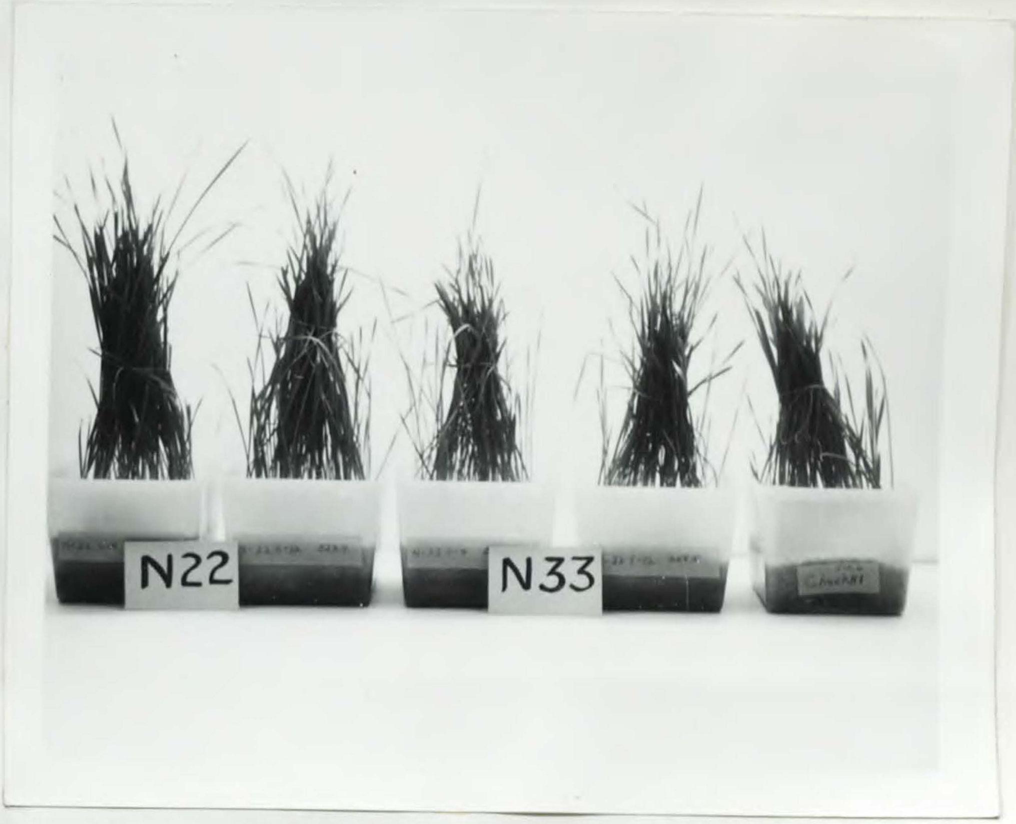


Fig. 52 Rye seedlings growing on soils taken from sample sites N-22 and N-33 along with check plants.

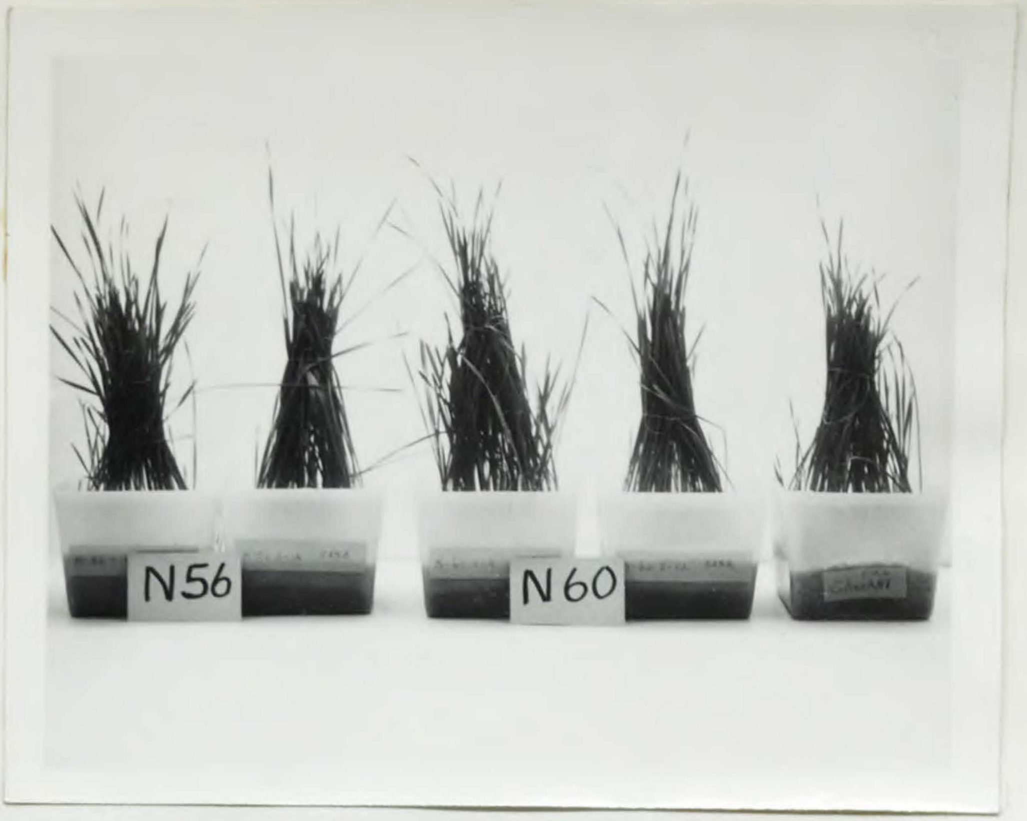


Fig. 53 Rye seedlings growing on soils taken from sample sites N-56 and N-60. Check plants in container on right.

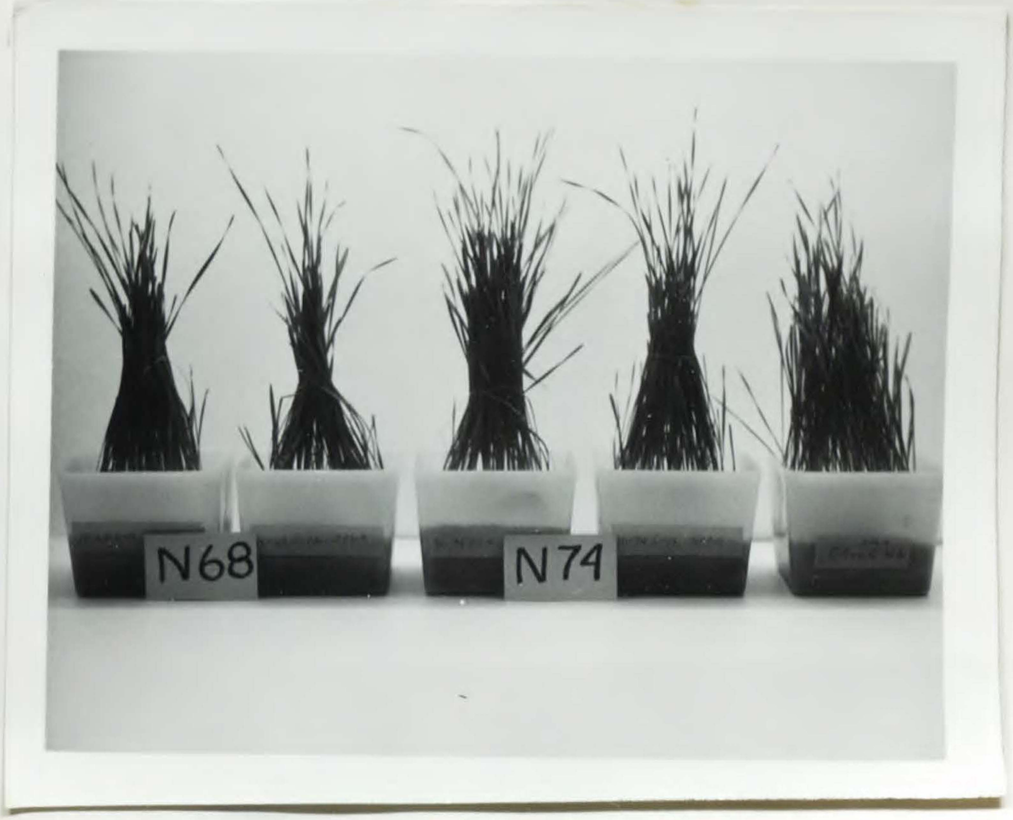
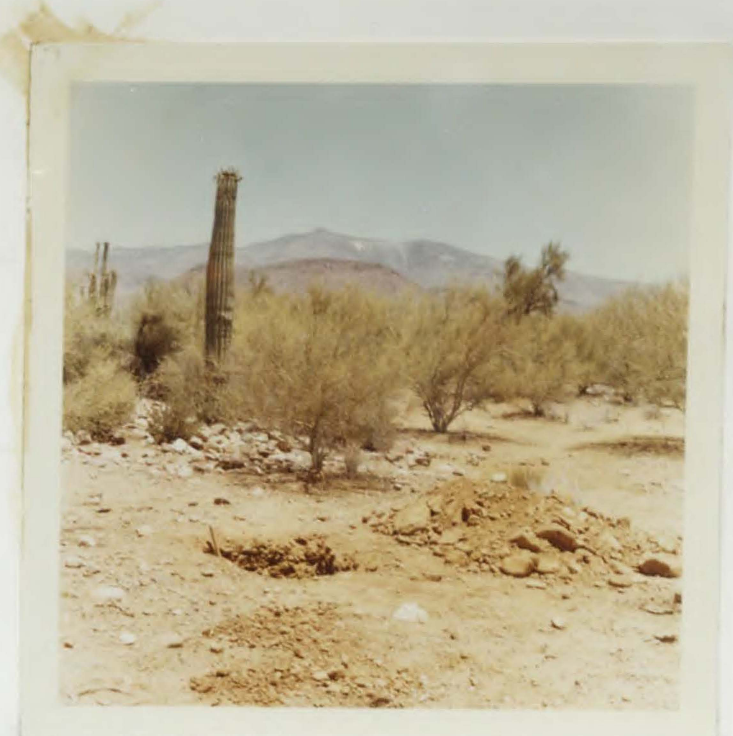
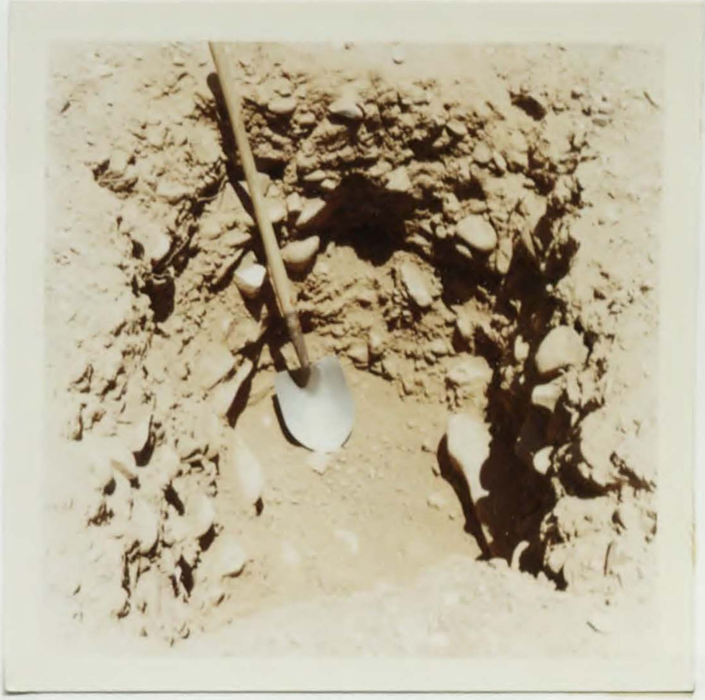


Fig. 54 Rye seedlings growing on soils taken from sample sites N-68 and N-74. Check plants in container on right.

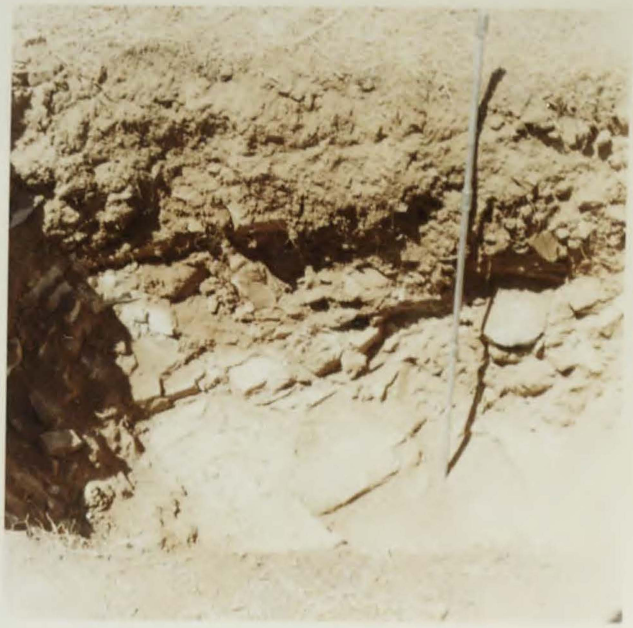


Site WES-3. Note the relationship of this site to Asbestos Peak. This shows the dominant vegetation of Palo Verde, Mesquite, and Saguaro Cactus.

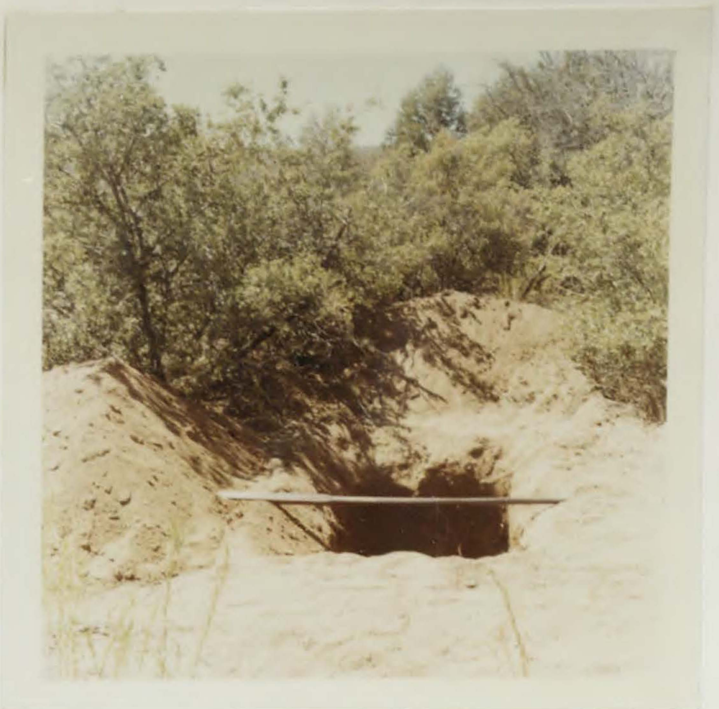


Site WES-3. This photo illustrates the extreme rocky nature of the soil at this site.

Site WES-4. North of the Baserock Lysimeters. Surface infiltrometers are in place and in operation.

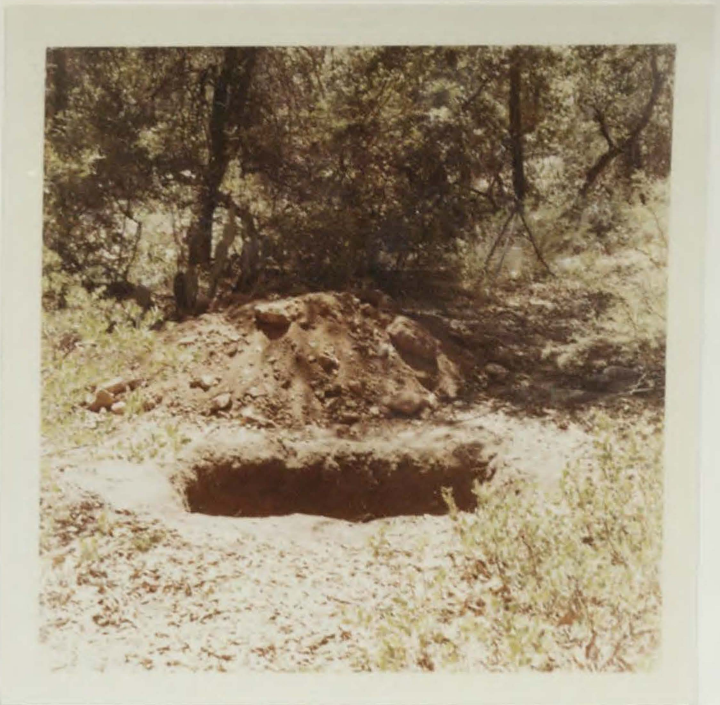


Site WES-4. Note the solid bedrock at the bottom of the pit. The soil in this area remains at or near saturation much of the winter.

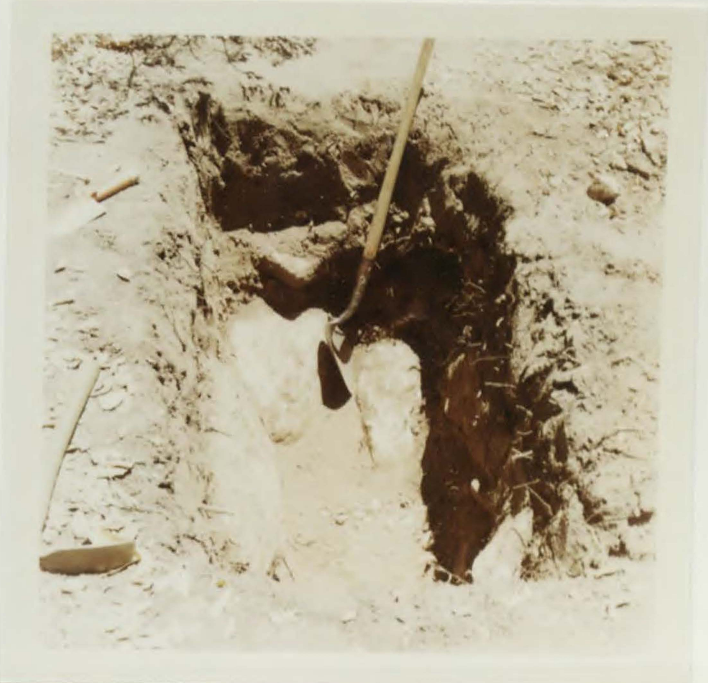


Site WES-5. The dense chaparral consisted of manzanita primarily on a deep, coarse-grained diabase soil.

Site WES-5. This sample pit was dug to a depth of 2 meters in the coarse diabase.

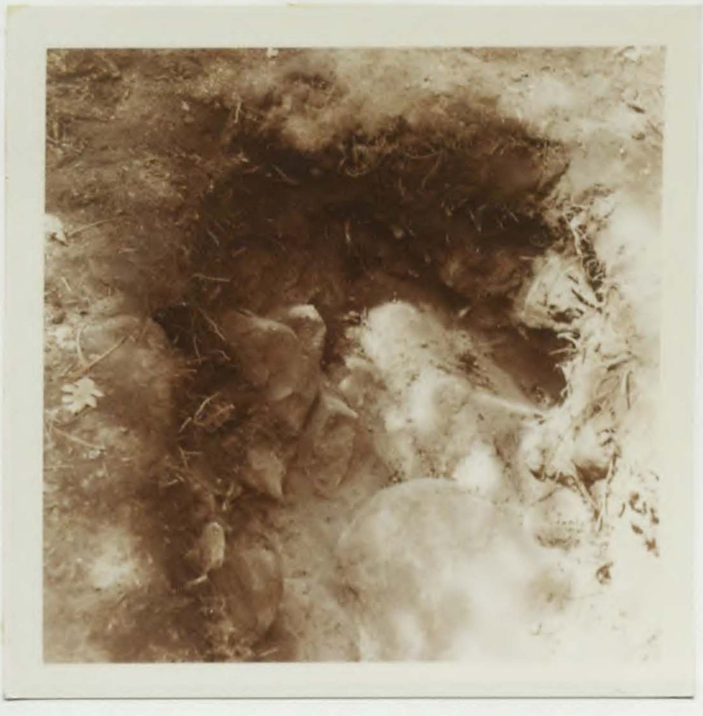


Site WES-6. The riparian site on Parker Creek. Note the amount and size of rocks and boulders taken from the pit.

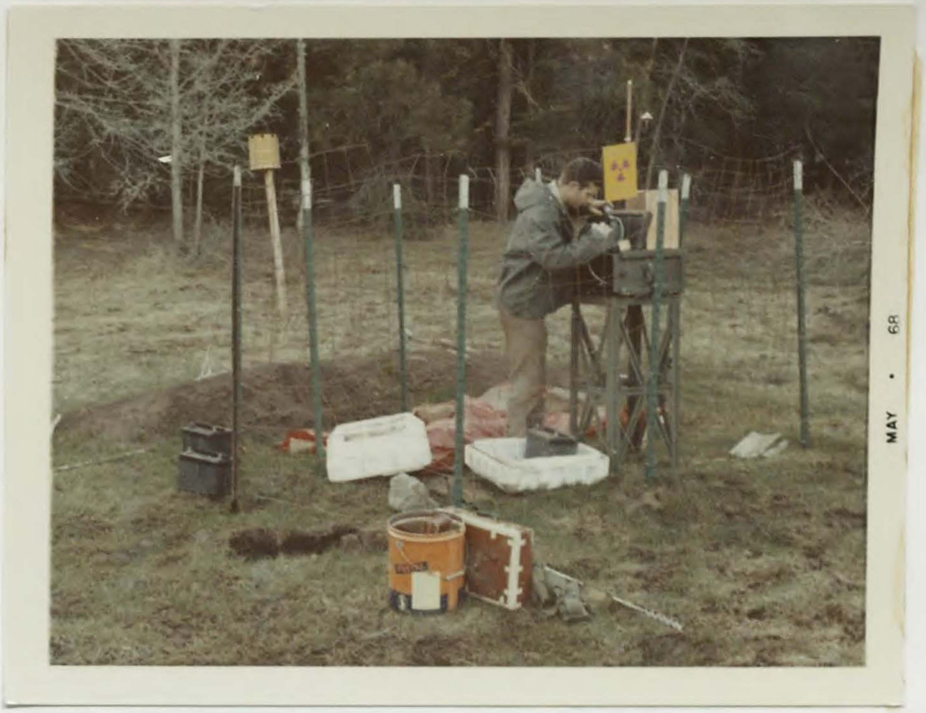


Site WES-6. The large boulders in the bottom of the pit discouraged digging any deeper.

Site WES-7. In the mixed conifer forest west of the Peterson Ranch meadow in upper Workman Creek.



Site WES-7. The soil at this site contained many rocks and boulders of a wide range in size. Note abundance of roots in surface 18 inches.

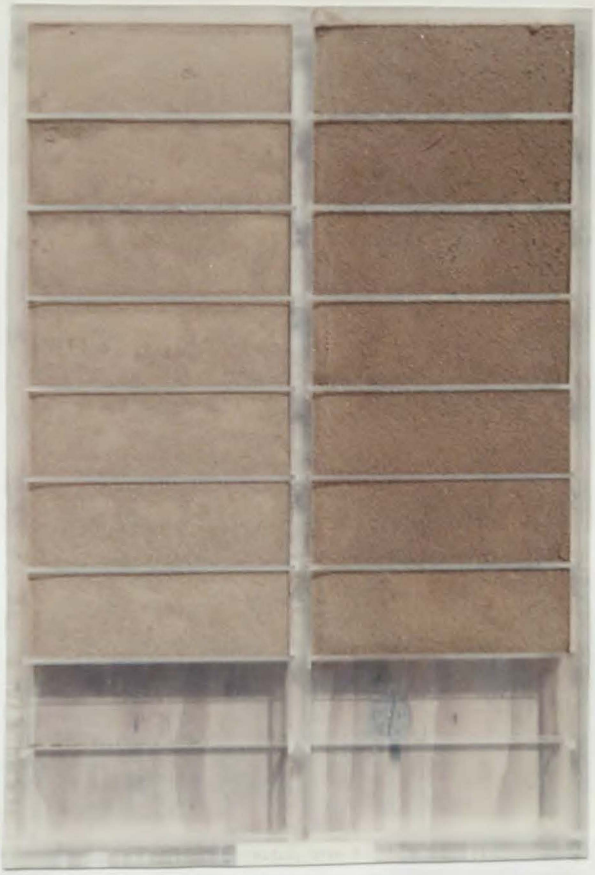


Site WES-8. This site was located in the open area of the central meadow of Peterson Ranch just east of the weather station.

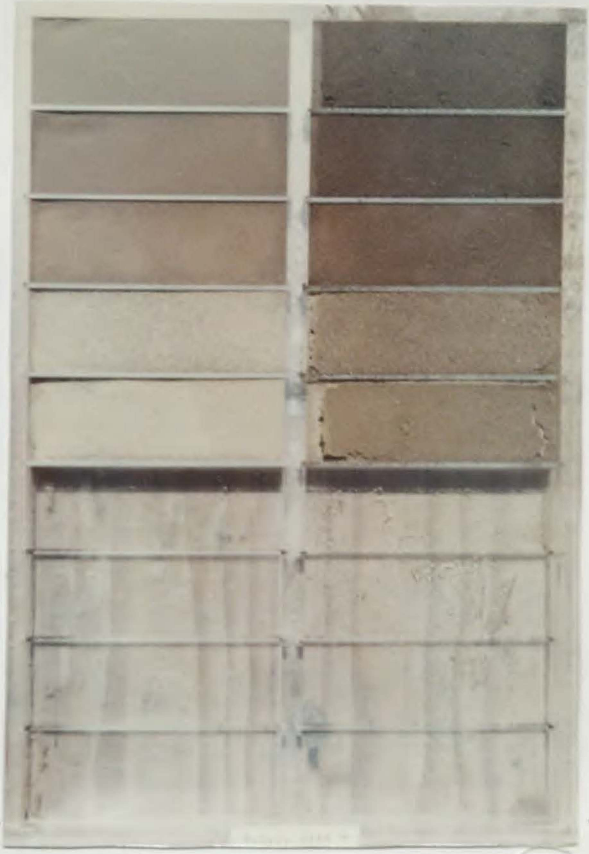
Site WES-8. The soil at this location was very deep, black in color and almost completely devoid of rock.

Site WES-9. Located in the dense forest area about 1/4 mile north of the weather station in the central meadow of Peterson Ranch in upper Workman Creek.

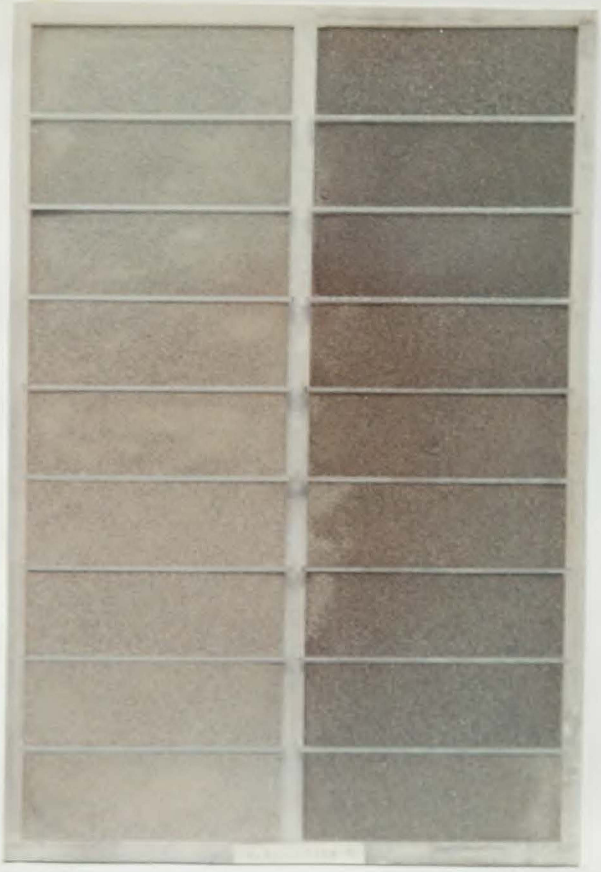
Site WES-9. This soil was filled with many rocks and boulders. The large ones at the bottom of the pit prevented further digging.



WES Site 3. In this synthetic soil profile each section represents a depth of 6 inches from the surface. This site was located northeast of Roosevelt Lake between the lake and the mountains.



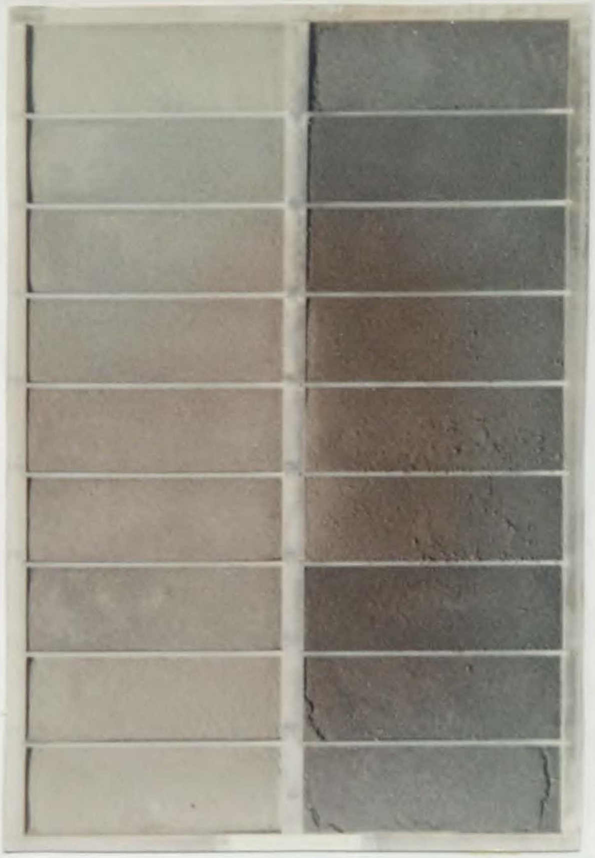
WES Site 4. This site was located on the grass slope north of the base rock lysimeters. The soil in this area averages about 2½ feet deep.



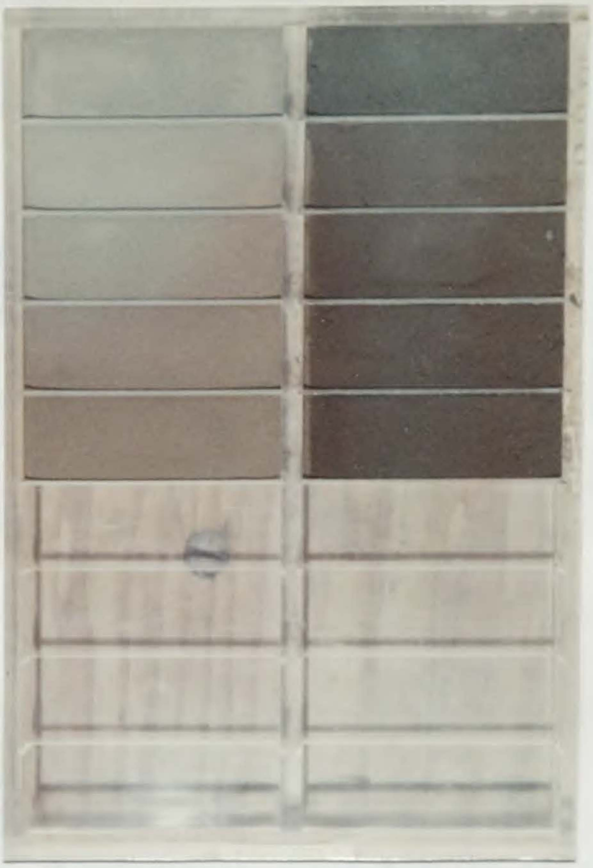
WES Site 5. This site was located in the dense chaparral west of the natural drainages below the Sierra Ancha headquarters. The soil is a deep diabase.

WES Site 6. This site was located on Parker Creek just below the Sierra Ancha Headquarters.

WES Site 7. This site was located in the mixed fir-pine forest of the Middle Fork of Workman Creek just below the lower meadow.



WES Site 8. This site was located in the central meadow of the Middle Fork of Workman Creek just east of the weather station.



WES Site 9. This site was located in the forested area of the Middle Fork north of the weather station.

TABLE 5. Dry and Moist Soil Colors of Soils Taken from Sample Pits in Upper Workman Creek, North Fork Drainage.

		Dry		Moist	
Pit Location	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
1NO	0-10	10YR 4/2	dark grayish brown	10YR 2/1	black
	10-20	10YR 4/2	dark grayish brown	10YR 2/1	black
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
	30-41	10YR 6/3	pale brown	5YR 4/4	reddish brown
	41-51	10YR 6/4	light yellowish brown	5YR 5/6	yellowish red
	51-61	10YR 5/4	yellowish brown	5YR 5/6	yellowish red
	61-71	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
	71-81	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
	81-91	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
2NF	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/4	yellowish brown	7.5YR 4/4	medium-dark brown
	20-30	10YR 5/4	yellowish brown	5YR 5/6	yellowish red
	30-41	10YR 5/6	yellowish brown	5YR 5/6	yellowish red
	41-51	10YR 6/4	light yellowish brown	5YR 5/8	yellowish red
	51-61	10YR 6/4	light yellowish brown	7.5YR 5/6	yellowish red
	61-71	10YR 6/4	light yellowish brown	7.5YR 5/6	yellowish red
	71-81	10YR 7/4	very pale brown	7.5YR 5/8	yellowish red
	81-91	10YR 7/4	very pale brown	7.5YR 5/8	yellowish red
3NO	0-10	2.5Y 6/2	light brownish gray	10YR 2/1	black
	10-20	10YR 6/2	light brownish gray	10YR 2/2	very dark brown
	20-30	10YR 6/3	pale brown	10YR 4/3	medium-dark brown
	30-41	10YR 6/3	pale brown	7.5YR 5/4	brown
	41-51	10YR 6/4	light yellowish brown	5YR 5/6	yellowish red
	51-61	10YR 6/4	light yellowish brown	5YR 5/8	yellowish red
	61-71	10YR 6/4	light yellowish brown	5YR 5/8	yellowish red
	71-81	10YR 6/4	light yellowish brown	5YR 5/8	yellowish red
	81-91	10YR 7/4	very pale brown	5YR 5/8	yellowish red

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample pits in Upper Workman Creek, North Fork Drainage.

		Dry		Moist	
Pit Location	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
4NF	0-10	10YR 5/2	grayish brown	10YR 2/1	black
	10-20	10YR 4/1	dark gray	10YR 2/2	very dark brown
	20-30	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	30-41	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	41-51	10YR 6/3	pale brown	7.5YR 4/4	medium-dark brown
	51-61	10YR 6/3	pale brown	7.5YR 4/4	medium-dark brown
	61-71	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	71-81	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	81-91	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
5NO	0-10	10YR 4/2	dark grayish brown	10YR 2/1	black
	10-20	10YR 5/3	brown	5YR 3/4	dark reddish brown
	20-30	7.5YR 6/4	light brown	5YR 3/4	dark reddish brown
	30-41	7.5YR 6/4	light brown	5YR 4/4	reddish brown
	41-51	7.5YR 6/4	light brown	5YR 4/4	reddish brown
	51-61	7.5YR 6/6	reddish yellow	5YR 5/6	yellowish red
	61-71	7.5YR 6/6	reddish yellow	5YR 5/6	yellowish red
	71-81	7.5YR 6/6	reddish yellow	5YR 5/8	yellowish red
	81-91	7.5YR 6/6	reddish yellow	5YR 5/8	yellowish red
6NF	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 6/3	pale brown	5YR 4/4	reddish brown
	20-30	10YR 6/4	light yellowish brown	5YR 4/4	reddish brown
	30-41	10YR 5.5/4	light yellowish brown	5YR 5/6	yellowish red
	41-51	10YR 5.5/4	light yellowish brown	5YR 5/8	yellowish red
	51-61	10YR 5/4	yellowish brown	7.5YR 4/4	medium-dark brown
	61-71	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	71-81	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	81-91	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, North Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
N4	0-10	10YR 4/2	dark grayish brown	10YR 2/1	black
	10-20	2.5Y 6/2	light brownish gray	10YR 3/3	dark brown
	20-30	10YR 7/3	very pale brown	10YR 5/3	brown
N6	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 4/3	medium-dark brown	10YR 2/2	very dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
N14	0-10	10YR 5/2	grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/2	grayish brown	10YR 2/2	very dark brown
	20-30	10YR 5/3	brown	10YR 3/3	dark brown
N22	0-10	10YR 3/1	very dark gray	10YR 2/1	black
	10-20	10YR 4/2	dark grayish brown	10YR 2/1	black
	20-30	10YR 4/2	dark grayish brown	10YR 2/1	black
N33	0-10	7.5YR 5/6	strong brown	5YR 3/4	dark reddish brown
	10-20	7.5YR 6/6	reddish yellow	7.5YR 5/6	strong brown
	20-30	7.5YR 6/8	reddish yellow	7.5YR 5/6	strong brown
N44	0-10	10YR 4/1	dark gray	10YR 2/1	black
	10-20	10YR 6/2	light brownish gray	7.5YR 3/2	dark brown
	20-30	10YR 5.5/3	pale-medium brown	7.5YR 4/2	medium-dark brown
N48	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/2	grayish brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
N56	0-10	10YR 4/1	dark gray	10YR 2/1	black
	10-20	10YR 4/1	dark gray	10YR 2/2	very dark brown
	20-30	10YR 5/2	grayish brown	7.5YR 4/2	medium-dark brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, North Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
N60	0-10	10YR 4/3	medium-dark brown	10YR 3/3	dark brown
	10-20	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/2	dark grayish brown	7.5YR 3/2	dark brown
N68	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 6/4	light yellowish brown	10YR 4/4	dark yellowish brown
N74	0-10	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/4	yellowish brown	10YR 4/4	dark yellowish brown
	20-30	10YR 5/4	yellowish brown	10YR 4/4	dark yellowish brown
N81	0-10	10YR 4/3	medium-dark brown	7.5YR 3/2	dark brown
	10-20	10YR 5/3	brown	10YR 3/4	dark yellowish brown
	20-30	10YR 5/4	yellowish brown	7.5YR 4/4	medium-dark brown
N88	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	10YR 3/4	dark yellowish brown
	20-30	10YR 5/4	yellowish brown	10YR 4/4	dark yellowish brown
N95	0-10	10YR 4/3	medium-dark brown	7.5YR 3/2	dark brown
	10-20	10YR 5/3	brown	10YR 3/3	dark brown
	20-30	10YR 5/3	brown	10YR 3/4	dark yellowish brown
N98	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	10YR 3/3	dark brown
	20-30	10YR 5/3	brown	10YR 3/3	dark brown
N107	0-10	10YR 2/2	very dark brown	10YR 2/1	black
	10-20	10YR 2/2	very dark brown	10YR 2/1	black
	20-30	10YR 3/1	very dark gray	10YR 2/2	very dark brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, North Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
N116	0-10	10YR 3/2	very dark grayish brown	10YR 2/1	black
	10-20	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/2	dark grayish brown	7.5YR 3/2	dark brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Pits in Upper Workman Creek, Middle Fork Drainage.

		Dry		Moist	
Pit Location	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
1MO	0-10	10YR 3/2	very dark grayish brown	10YR 2/1.5	black-very dark brown
	10-20	10YR 3/2	very dark grayish brown	10YR 2/1.5	black-very dark brown
	20-30	10YR 3/1	very dark gray	10YR 2/1	black
	30-41	10YR 4/1	dark gray	10YR 2/1	black
	41-51	10YR 4/1	dark gray	10YR 2/1	black
	51-61	5Y 4/1	dark gray	5YR 2/1	black
	61-71	5Y 4/1	dark gray	5YR 2/1	black
	71-81	5Y 4/1	dark gray	7.5YR 2/0	black
	81-91	5Y 4/1	dark gray	7.5YR 2/1	black
2MF	0-10	10YR 4/1	dark gray	10YR 2/1	black
	10-20	10YR 5/2	grayish brown	7.5YR 3/2	dark brown
	20-30	10YR 6/2	light brownish gray	7.5YR 3/2	dark brown
	30-41	10YR 6.5/2	light brownish gray	7.5YR 4/2	medium-dark brown
	41-51	7.5YR 6.5/2	pinkish gray	5 YR 4/4	reddish brown
	51-61	7.5YR 6/4	light brown	5YR 4/6	yellowish red
	61-71	7.5YR 6/4	light brown	5YR 4/4	reddish brown
	71-81	7.5YR 6/4	light brown	5YR 4/4	reddish brown
	81-91	7.5YR 6/4	light brown	5YR 4/4	reddish brown
3MO	0-10	10YR 4/3	medium-dark brown	5YR 2/2	dark reddish brown
	10-20	10YR 4/2	dark grayish brown	5YR 3/2	dark reddish brown
	20-30	10YR 5/2	grayish brown	5YR 3/1	very dark gray
	30-41	10YR 4/2	dark grayish brown	5YR 3/1	very dark gray
	41-51	10YR 4/2	dark grayish brown	5YR 3/1	very dark gray
	51-61	10YR 4/2	dark grayish brown	10YR 3/1	very dark gray
	61-71	10YR 4/2	dark grayish brown	10YR 3/1	very dark gray
	71-81	10YR 6/2	gray	10YR 3/1	very dark gray
	81-91	10YR 5/2	light brownish gray	10YR 3/1	very dark gray

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Pits in Upper Workman Creek, Middle Fork Drainage.

		Dry		Moist	
Pit Location	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
4MF	0-10	10YR 4/2	dark grayish brown	10YR 2/1	black
	10-20	10YR 4/2	dark grayish brown	10YR 2/1	black
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
	30-41	10YR 6/3	pale brown	5YR 4/4	reddish brown
	41-51	10YR 6/4	light yellowish brown	5YR 5/6	yellowish red
	51-61	10YR 5/4	yellowish brown	5YR 5/6	yellowish red
	61-71	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
	71-81	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
	81-91	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
5MF	0-10	10YR 4/1	dark gray	10YR 2/1	black
	10-20	10YR 5/2	grayish brown	10YR 2/2	very dark brown
	20-30	10YR 5/3	brown	7.5YR 4/2	medium-dark brown
	30-41	10YR 6/3	pale brown	7.5YR 4/4	medium-dark brown
	41-51	10YR 6/3	pale brown	7.5YR 5/6	strong brown
	51-61	10YR 6/3	pale brown	7.5YR 5/6	strong brown
	61-71	10YR 6/3	pale brown	7.5YR 5/6	strong brown
	71-81	10YR 7/4	very pale brown	7.5YR 5/6	strong brown
	81-91	10YR 7/4	very pale brown	7.5YR 5/6	strong brown
6MF	0-10	2.5Y 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	20-30	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	30-41	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	41-51	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	51-61	10YR 5/3	brown	5YR 3/3	reddish brown
	61-71	10YR 5/3	brown	5YR 3/3	reddish brown
	71-81	10YR 5/3	brown	5YR 3/2	reddish brown
	81-91	10YR 5/3	brown	5YR 3/2	reddish brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, Middle Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
M1	0-10	10YR 4/2	dark grayish brown	7.5YR 3/2	dark brown
	10-20	10YR 4/3	brown-dark brown	10YR 2/2	very dark brown
	20-30	10YR 6/3	pale brown	10YR 3/3	dark brown
M3	0-10	2.5Y 5/2	weak red	10YR 2/2	very dark brown
	10-20	10YR 6/4	light yellowish brown	7.5YR 4/4	brown-dark brown
	20-30	10YR 4/3	brown-dark brown	7.5YR 4/2	brown-dark brown
M7	0-10	2.5YR 4/2	weak red	10YR 2/2	very dark brown
	10-20	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
M12	0-10	2.5Y 4/2	weak red	10YR 3/2	very dark grayish brown
	10-20	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
M19	0-10	10YR 4/3	brown-dark brown	10YR 3/4	dark yellowish brown
	10-20	10YR 4/4	dark yellowish brown	7.5YR 3/2	dark brown
	20-30	7.5YR 5/6	strong brown	5YR 4/4	reddish brown
M28	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
M39	0-10	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 6/4	light yellowish brown	7.5YR 4/4	brown-dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, Middle Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
M54	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/3	brown-dark brown	10YR 3/2	very dark grayish brown
M70	0-10	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	20-30	10YR 4/2	dark grayish brown	10YR 3/2	very dark grayish brown
M89	0-10	10YR 4/2	dark grayish brown	7.5YR 3/2	dark brown
	10-20	10YR 4/3	brown-dark brown	7.5YR 3/2	dark brown
	20-30	10YR 6/3	pale brown	7.5YR 4/2	dark brown-brown
M109	0-10	10YR 6/3	pale brown	10YR 4/4	dark yellowish brown
	10-20	10YR 5/2	grayish brown	10YR 2/2	very dark brown
	20-30	10YR 6/4	light yellowish brown	7.5YR 3/2	dark brown
M131	0-10	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 4/2	dark grayish brown	10YR 3/3	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
M152	0-10	10YR 3/2	very dark grayish brown	10YR 3/2	very dark grayish brown
	10-20	10YR 4/2	dark grayish brown	10YR 3/2	very dark grayish brown
	20-30	10YR 5/2	grayish brown	10YR 3/3	dark brown
M167	0-10	10YR 5/2	grayish brown	10YR 3/2	very dark grayish brown
	10-20	10YR 5/2	grayish brown	10YR 3/2	very dark grayish brown
	20-30	10YR 5/3	brown	10YR 3/2	very dark grayish brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Pits in Upper Workman Creek, South Fork Drainage.

		Dry		Moist	
Pit Location	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
1SF	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/2	grayish brown	10YR 3/2	very dark grayish brown
	20-30	10YR 5/2	grayish brown	10YR 3.5/4	dark yellowish brown
	30-41	10YR 5/3	brown	10YR 3.5/4	dark yellowish brown
	41-51	10YR 5/3	brown	10YR 3.5/4	dark yellowish brown
	51-61	10YR 6/4	light yellowish brown	10YR 4/3	medium-dark brown
	61-71	10YR 5/4	yellowish brown	10YR 4/4	dark yellowish brown
	71-81	10YR 5/4	yellowish brown	10YR 3.5/4	dark yellowish brown
	81-91	10YR 5/4	yellowish brown	10YR 3.5/4	dark yellowish brown
2SF	0-10	10YR 3/2	very dark grayish brown	7.5YR 2/0	black
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
	30-41	10YR 5.5/3	pale-medium brown	7.5YR 3/2	dark brown
	41-51	10YR 5.5/3	pale-medium brown	7.5YR 4/4	medium-dark brown
	51-61	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	61-71	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	71-81	10YR 6/3	pale brown	7.5YR 5/6	strong brown
	81-91	10YR 6/3	pale brown	7.5YR 5/6	strong brown
3SF	0-10	10YR 5.5/3	medium-pale brown	5YR 3/2	dark reddish brown
	10-20	10YR 5/3	medium brown	5YR 3/3	dark reddish brown
	20-30	10YR 6/3	pale brown	5YR 3/3	dark reddish brown
	30-41	10YR 6/3	pale brown	5YR 3/2	dark reddish brown
	41-51	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	51-61	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	61-71	10YR 5/3	brown	7.5YR 3/2	dark brown
	71-81	10YR 6/4	light yellowish brown	10YR 4/4	dark yellowish brown
	81-91	10YR 6/4	light yellowish brown	10YR 4/4	dark yellowish brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Pits in Upper Workman Creek, South Fork Drainage.

		Dry		Moist	
Pit Location	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
4SO	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/4	yellowish brown	5YR 4/4	reddish brown
	20-30	10YR 6/3	pale brown	7.5YR 4/4	medium-dark brown
	30-41	10YR 6/4	light yellowish brown	7.5YR 5/6	strong brown
	41-51	10YR 7/4	very pale brown	7.5YR 5/6	strong brown
	51-61	10YR 7/4	very pale brown	7.5YR 5/6	strong brown
	61-71	10YR 7/3	very pale brown	7.5YR 5/6	strong brown
	71-81	10YR 7/3	very pale brown	7.5YR 5/6	strong brown
	81-91	10YR 7/3	very pale brown	7.5YR 6/6	strong brown
5SO	0-10	10YR 4/3	medium-dark brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	10YR 3/4	dark yellowish brown
	30-41	10YR 5/2	grayish brown	10YR 3/3	dark brown
	41-51	10YR 5/2	grayish brown	10YR 3/3	dark brown
	51-61	2.5Y 7/2	light gray	2.5Y 5/3	light olive-grayish brown
	61-71	2.5Y 7/2	light gray	2.5Y 5/3	light olive-grayish brown
	71-81	2.5Y 6/3	light brownish gray	2.5Y 5/3	light olive-grayish brown
	81-91	2.5Y 6/3	light brownish gray	2.5Y 5/3	light olive-grayish brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, South Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
S2	0-10	10YR 4/3	medium-dark brown	10YR 2/2	very dark brown
	10-20	10YR 4/3	medium-dark brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 4/4	medium-dark brown
S5	0-10	10YR 3/2	very dark grayish brown	10YR 2/1	black
	10-20	10YR 4/3	medium-dark brown	7.5YR 3/2	dark brown
	20-30	7.5YR 4/4	medium-dark brown	2.5YR 3/6	dark red
S10	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
S13	0-10	10YR 5/3	brown	7.5YR 3/2	dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
S18	0-10	2.5Y 5/2	grayish brown	10YR 3/1	very dark gray
	10-20	10YR 6/3	pale brown	10YR 3/1	very dark gray
	20-30	10YR 6/4	light yellowish brown	10YR 4/2	dark grayish brown
S27	0-10	10YR 5/1	gray	10YR 2/2	very dark brown
	10-20	10YR 5/2	grayish brown	7.5YR 4/4	medium-dark brown
	20-30	5Y 6/3	pale olive	7.5YR 5/6	strong brown
S31	0-10	10YR 5/3	brown	5YR 3/2	dark reddish brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
S41	0-10	10YR 6/3	pale brown	10YR 4/2	dark grayish brown
	10-20	10YR 6/3	pale brown	10YR 5/4	yellowish brown
	20-30	10YR 6/4	light yellowish brown	10YR 5/4	yellowish brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, South Fork Drainage.

		Dry		Moist	
Survey Peg No.	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
S46	0-10	10YR 4/2	dark grayish brown	10YR 3/1	very dark gray
	10-20	10YR 4/3	medium-dark brown	7.5YR 3/2	dark brown
	20-30	10YR 5/4	yellowish brown	7.5YR 4/2	medium-dark brown
S54	0-10	10YR 3/3	dark brown	10YR 2/1	black
	10-15	10YR 4/2	dark grayish brown	10YR 3/1	very dark gray
S58	0-10	10YR 4/3	medium-dark brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
S68	0-10	10YR 4/3	medium-dark brown	5YR 3/2	dark reddish brown
	10-20	10YR 5/3	brown	5YR 3/3	dark reddish brown
	20-30	10YR 5/3	brown	5YR 3/4	dark reddish brown
S79	0-10	10YR 4/3	medium-dark brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/4	yellowish brown	5YR 4/4	reddish brown
S89	0-10	10YR 6/4	light yellowish brown	10YR 2/2	very dark brown
	10-20	10YR 6/4	light yellowish brown	7.5YR 4/4	medium-dark brown
	20-30	10YR 5/2	grayish brown	7.5YR 5/6	strong brown
S101	0-10	2.5Y 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	10YR 3/4	dark yellowish brown
	20-30	10YR 5/4	yellowish brown	10YR 5/6	yellowish brown
S114	0-10	10YR 3/2	very dark grayish brown	10YR 2/1	black
	10-20	10YR 5/2	grayish brown	10YR 3/2	very dark grayish brown
	20-30	10YR 5.5/3	pale-medium brown	10YR 3/3	dark brown

TABLE 5 Continued. Dry and Moist Soil Colors of Soils Taken from Sample Locations in Upper Workman Creek, South Fork Drainage.

Survey Peg No.	Depth (cm)	Dry Munsell Notation	Dry Color Name	Moist Munsell Notation	Moist Color Name
S123	0-10	10YR 5/2	grayish brown	10YR 2/2	very dark brown
	10-20	10YR 6/3	pale brown	10YR 3/4	dark yellowish brown
	20-30	10YR 6/4	light yellowish brown	10YR 5/4	yellowish brown
S132	0-10	10YR 5/3	brown	10YR 3/1	very dark gray
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown
S140	0-10	10YR 4.5/2	medium-dark grayish brown	5YR 3/2	dark reddish brown
	10-20	10YR 5/3	brown	10YR 3/4	dark yellowish brown
	20-30	10YR 5/4	yellowish brown	10YR 3/4	dark yellowish brown
S143	0-10	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	10-20	10YR 5/3	brown	7.5YR 3/2	dark brown
	20-30	10YR 5/3	brown	7.5YR 3/2	dark brown

Table 6. Analytical Data on Workman Creek Soils from Sample Pits. Collected During June, 1965.

Pit Site	Depth (inches)	Infiltration Rate (ml/hr/cm^2)	Dispersion Percentage %
1NO	0-4	3.41	47.1
	4-8		47.4
	8-12		45.8
	24-28	0.19	
2NF	0-4	10.58	24.8
	4-8		21.9
	8-12		28.4
	32-36	0.28	
3NO	0-4	28.45	31.9
	4-8		38.8
	8-12		40.3
	32-34	0.12	
4NF	0-4		33.6
	4-8		27.4
	8-12		38.5
	32-34		
5NO	0-4	6.96	51.3
	4-8		58.8
	8-12		62.3
	32-34	0.08	
6NF	0-4		41.1
	4-8		53.2
	8-12		59.0
	32-34	1.17	
1MO	0-4	14.84	31.2
	4-8		35.2
	8-12		28.9
	32-34	0.07	
2MF	0-4	20.83	36.4
	4-8		44.5
	8-12		52.0
	32-34	0.04	
3MO	0-4	14.30	53.3
	4-8		47.0
	8-12		37.5
	32-34	0.13	

Table 6. Analytical Data on Workman Creek Soils from Sample Pits. Collected During June, 1965.

Pit Site	Depth (inches)	Infiltration Rate ($ml/hr/cm^2$)	Dispersion Percentage %
4MF	0-4	35.42	32.7
	4-8		27.8
	8-12		38.6
	32-34	0.07	
5MF	0-4	9.19	37.4
	4-8		26.2
	8-12		24.5
	32-34		
6MF	0-4	8.30	32.2
	4-8		36.5
	8-12		50.8
	32-34	0.35	
1SF	0-4	9.45	27.3
	4-8		32.7
	8-12		40.6
	32-34		
2SF	0-4	4.80	29.3
	4-8		36.2
	8-12		32.7
	32-34	0.09	
3SF	0-4	6.98	47.1
	4-8		44.1
	8-12		46.3
	32-34		
4SO	0-4	1.80	32.8
	4-8		43.3
	8-12		44.2
	32-34	0.04	
5SO	0-4	44.98	34.0
	4-8		36.0
	8-12		42.2
	32-34	0.15	

Table 7. Analytical Data on Workman Creek Soils from Sample Pits. Samples Collected During the Month of June, 1965.

							Particle Size Analysis				
Pit Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade	Soil Moisture %
1NO	0-10	6.20	1.02	6.55	0.11	236.3	23.0*	51.7	25.3	Silt Loam	5.58
	10-20	6.25	1.53	3.26	0.06	194.9	22.1*	54.3	23.6	Silt Loam	4.82
	20-30	6.15	1.16	1.81	0.04	153.6	38.0	34.8	27.2	Clay Loam	8.20
	30-40	5.90	1.69	0.76	0.03	130.0	33.6	37.6	28.8	Clay Loam	10.09
	40-50	5.60	1.74	0.74	0.03	124.1	31.2	36.7	32.1	Clay Loam	14.16
	50-60	5.60	1.79	0.67	0.03	106.3	29.8	36.6	33.6	Clay Loam	12.64
	60-70	5.60	1.79	0.67	0.03	141.8	29.9	37.4	32.7	Clay Loam	15.34
2NF	0-10	5.31	1.15	10.79	0.22	366.2	20.4*	54.0	25.6	Clay Loam	24.5
	10-20	5.25	1.51	4.50	0.11	236.3	14.4*	37.0	48.6	Clay	25.8
	20-30	5.40	1.63	2.57	0.11	212.7	23.4	34.8	41.8	Clay	34.8
	30-40	5.15	1.80	1.90	0.11	218.6	15.3	34.8	49.9	Clay	30.5
	40-50	5.26	1.61	1.51	0.06	183.1	9.6	39.8	50.6	Clay	33.8
	50-60	5.20	1.59	1.66	0.06	177.2	9.1	37.9	53.0	Clay	32.2
	60-70	5.30	1.54	1.09	0.05	141.8	5.9	42.9	51.2	Silty Clay	33.8
	70-80	5.34	1.61	0.95	0.05	141.8	7.5	42.1	50.4	Silty Clay	29.8
	80-90	5.30	1.52	1.12	0.05	159.4	5.7	44.1	50.2	Silty Clay	33.4
3NO	0-10	5.55	1.21	8.54	0.29	224.5	22.2*	42.8	35.0	Clay Loam	5.79
	10-20	5.50	1.56	5.10	0.12	153.6	23.2*	33.8	43.0	Clay	9.75
	20-30	5.50	1.68	2.60	0.07	124.1	26.0	35.4	38.6	Clay Loam	10.12
	30-40	5.60	1.88	2.10	0.06	206.7	18.7*	40.1	41.2	Clay	18.93
	40-50	5.44	1.64	1.97	0.04	112.2	8.8*	38.0	53.2	Clay	23.37
	50-60	5.30	1.57	1.36	0.04	218.6	9.6	36.6	53.8	Clay	30.71
	60-70	5.35	1.50	0.90	0.03	177.2	10.3	35.7	54.0	Clay	29.61
	70-80	5.30	1.52	0.88	0.03	183.1	21.4	36.3	42.3	Clay	33.74
	80-85	5.50	1.58	0.82	0.03	194.9	25.7	35.2	39.1	Clay Loam	32.77

* Pre-treated with 30% H_2O_2

Table 7. Analytical Data on Workman Creek Soils from Sample Pits. Samples Collected During the Month of June, 1965.

Pit Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Particle Size Analysis Sand %	Silt %	Clay %	Grade	Soil Moisture %
4NF	0-10	5.75		12.29	0.33	313.1	32.1*	38.3	29.6	Clay Loam	13.71
	10-20	5.73	1.10	7.24	0.19	354.4	26.2*	41.8	32.0	Clay Loam	11.99
	20-30	5.85	1.75	1.72	0.06	313.1	28.1	43.1	28.8	Clay Loam	8.51
	30-40	5.63	1.86	1.21	0.04	259.9	24.4	46.8	28.8	Clay Loam	9.32
	40-50	5.60	1.19	0.86	0.03	259.9	24.3	43.7	32.0	Clay Loam	8.70
	50-60	5.45	1.16	0.86	0.03	283.5	29.5	38.7	31.8	Clay Loam	10.57
	60-70	5.57	1.74	0.69	0.03	236.3	21.1	42.2	36.7	Clay Loam	10.09
	70-80	5.70	1.43	0.52	0.02	230.4	22.1	42.2	35.7	Clay Loam	11.48
	80-85	5.92	1.67	0.35	0.02	236.3	26.7	34.0	39.3	Clay Loam	11.85
5NO	0-10	5.88	1.46	9.67	0.05	236.3	47.0*	29.2	23.8	Loam	2.27
	10-20	5.70	1.90	2.57	0.04	206.8	40.7	35.5	23.8	Loam	5.11
	20-30	5.74	1.83	1.66	0.03	192.0	42.7	32.9	24.4	Loam	4.70
	30-40	5.40	1.70	0.69	0.04	200.8	29.7	40.4	29.9	Clay Loam	7.28
	40-50	5.35	1.84	1.02	0.04	153.6	23.6	34.2	42.2	Clay	14.43
	50-60	5.00	1.70	1.05	0.04	118.1	10.6	32.5	56.9	Clay	27.38
	60-70	4.92	1.72	1.38	0.04	94.5	10.5	25.7	63.8	Clay	30.64
	70-80	4.85	1.63	1.00	0.04	88.6	3.7	36.4	59.9	Clay	36.27
	80-90	4.90	1.70	0.74	0.03	82.7	7.2	32.5	60.3	Clay	38.39
6NF	0-10	5.93	1.51	5.79	0.14	384.5	42.0*	31.2	26.8	Loam	9.17
	10-20	5.70	1.67	1.31	0.04	336.7	30.6	42.3	27.1	Clay Loam	8.92
	20-30	5.25	1.65	1.29	0.04	283.5	30.4	38.4	31.2	Clay Loam	10.47
	30-40	5.05	1.70	1.09	0.03	212.7	26.7	38.7	34.6	Clay Loam	11.63
	40-50	5.00	1.72	0.62	0.03	159.5	27.7	33.8	38.5	Clay Loam	13.74
	50-60	5.20	1.66	0.41	0.02	189.0	22.2	35.0	42.8	Clay	15.34
	60-70	5.30	1.79	0.48	0.02	177.2	25.8	35.4	38.8	Clay Loam	14.16
	70-80	5.20	1.67	0.35	0.02	159.5	28.8	34.3	36.9	Clay Loam	13.22
	80-90	5.15	1.78	0.35	0.02	194.9	30.6	34.0	35.4	Clay Loam	13.18

* Pre-treated with 30% H_2O_2

Table 7. Analytical Data on Workman Creek Soils from Sample Pits. Samples Collected During the Month of June 1965.

Pit Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Particle Size Analysis				Soil Moisture %
							Sand %	Silt %	Clay %	Grade	
1MO	0-10	6.40	1.25	10.32	0.24	295.4	13.9*	44.1	42.0	Silty Clay	13.53
	10-20	6.48	1.40	9.60	0.24	224.5	18.0*	40.0	42.0	Silty Clay	19.23
	20-30	6.59	1.35	8.55	0.21	301.3	14.0*	39.2	46.8	Clay	20.94
	30-40	6.51	1.46	4.86	0.15	307.2	14.9*	41.1	44.0	Silty Clay	17.32
	40-50	6.50	1.49	6.07	0.18	218.6	7.0*	41.2	51.8	Silty Clay	29.94
	50-60	6.55	1.61	6.57	0.17	295.4	0.0*	38.8	61.2	Clay	30.97
	60-70	6.55	1.59	4.98	0.16	236.3	0.0*	41.0	59.0	Clay	37.44
	70-80	6.65	1.66	6.43	0.18	212.7	2.8*	37.0	60.2	Clay	37.97
	80-90	6.75	1.66	6.93	0.14	194.9	0.8*	39.6	61.2	Clay	39.15
2MF	0-10	5.80	0.88	11.76	0.16	130.0	51.2*	27.2	21.6	Sandy Cl.L.	6.73
	10-20	5.53	0.96	4.59	0.11	118.1	44.4*	32.9	23.7	Loam	5.64
	20-30	5.49	1.19	2.55	0.07	106.3	41.7	34.4	23.9	Loam	7.32
	30-40	5.26	1.30	1.33	0.05	130.0	47.8	28.4	23.8	Loam	8.81
	40-50	4.76	1.27	0.61	0.02	100.4	40.7	27.4	31.9	Clay Loam	19.46
	50-60	4.79	1.70	0.29	0.02	100.4	25.8	28.5	45.7	Clay	25.77
	60-70	4.60	1.13	1.26	0.02	124.1	11.0	31.4	57.6	Clay	32.84
	70-80	4.62	1.06	1.16	0.03	82.7	5.7	23.7	70.6	Clay	25.51
	80-90	4.98	1.16	0.62	0.01	94.5	21.7	28.7	49.6	Clay	15.67
3MO	0-10	5.88	1.40	4.02	0.10	124.1	28.2*	39.8	32.0	Clay Loam	10.69
	10-20	5.90	1.61	3.72	0.09	124.1	27.2*	35.3	37.5	Clay Loam	13.95
	20-30	6.10	1.65	3.43	0.09	130.0	27.3*	35.3	37.4	Clay Loam	16.25
	30-40	6.28	1.62	3.36	0.08	135.9	24.4*	34.3	41.3	Clay	15.83
	40-50	6.36	1.52	3.02	0.06	194.9	31.4*	33.4	35.2	Clay Loam	16.81
	50-60	6.55	1.61	3.53	0.08	183.1	23.4*	32.3	44.3	Clay	20.08
	60-70	6.60	1.58	4.24	0.12	147.7	00.0*	40.4	59.6	Clay	26.86
	70-80	6.55	1.74	4.21	0.12	147.7	00.0*	30.4	69.6	Clay	27.72
	80-90	6.58	1.62	3.92	0.12	153.6	00.0*	37.4	62.6	Clay	48.37

* Pre-treated with 30% H_2O_2

Table 7. Analytical Data on Workman Creek Soils from Sample Pits. Samples Collected During the Month of June, 1965.

Pit Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Particle Size Analysis				Soil Moisture %
							Sand %	Silt %	Clay %	Grade	
4MF	0-10	5.82	1.24	14.37	0.24	384.0	17.3*	46.7	36.0	Silty Cl. L.	17.98
	10-20	5.68	1.51	9.14	0.16	319.0	17.8*	43.2	39.0	Silty Cl. L.	18.00
	20-30	5.41	1.46	3.28	0.08	301.3	14.0*	38.4	47.6	Clay	13.57
	30-40	5.27	1.75	1.72	0.05	212.7	20.6	33.8	45.6	Clay	10.97
	40-50	5.10	1.78	1.55	0.05	200.8	10.3	28.2	61.5	Clay	11.81
	50-60	4.90	1.74	1.55	0.05	206.8	3.0	34.3	62.7	Clay	23.00
	60-70	4.75	1.94	1.03	0.04	141.8	0.6	31.9	67.5	Clay	31.79
	70-80	4.75	1.62	1.21	0.04	159.4	0.0	36.0	64.0	Clay	36.25
	80-90	4.75	1.72	1.03	0.04	141.8	1.9	41.9	56.2	Silty Clay	33.97
5MF	0-10	5.70	1.03	10.95	0.29	330.8	5.8*	50.2	44.0	Silty Clay	38.1
	10-20	5.55	1.27	6.12	0.15	295.4	5.5*	39.6	54.9	Clay	27.1
	20-30	5.47	1.52	4.48	0.13	271.7	2.8*	36.4	60.8	Clay	34.2
	30-40	5.30	1.46	1.04	0.08	230.4	14.8	39.2	46.0	Clay	38.2
	40-50	5.35	1.56	0.86	0.04	135.9	7.7	42.3	50.0	Silty Clay	39.2
	50-60	5.42	1.52	0.86	0.04	177.3	8.8	40.2	51.0	Clay	39.0
	60-70	5.43	1.46	0.86	0.05	236.3	3.7	42.3	54.0	Silty Clay	38.6
	70-80	5.45	1.47	0.86	0.04	242.2	4.7	41.3	54.0	Silty Clay	33.7
	80-90	5.60	1.39	0.69	0.03	183.1	0.8	47.3	51.9	Silty Clay	34.5
6MF	0-10	6.35	1.23	7.41	0.18	466.7	23.0*	39.4	37.6	Clay Loam	22.7
	10-20	5.33	1.51	3.45	0.09	295.4	21.0*	46.0	33.0	Clay Loam	17.2
	20-30	5.13	1.55	1.90	0.06	177.2	34.6	33.5	31.9	Clay Loam	16.6
	30-40	5.19	1.51	2.07	0.04	183.1	31.6	36.6	31.8	Clay Loam	14.0
	40-50	5.23	1.60	2.59	0.05	295.4	28.7	38.5	32.8	Clay Loam	17.9
	50-60	5.46	1.60	1.55	0.06	248.1	26.8	36.5	36.7	Clay Loam	17.9
	60-70	5.32	1.53	2.07	0.06	265.8	27.8	36.6	35.6	Clay Loam	15.1
	70-80	5.34	1.62	2.41	0.08	295.4	23.7	38.7	37.6	Clay Loam	18.2
	80-90	5.36	1.58	2.24	0.07	192.0	18.6	44.8	36.6	Silty Cl. L.	20.7

* Pre-treated with 30% H_2O_2

Table 7. Analytical Data on Workman Creek Soils from Sample Pits. Samples Collected During the Month of June, 1965.

Pit Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Particle Size Analysis: Sand %	Silt %	Clay %	Grade	Soil Moisture %
1SF	0-10	6.29	1.50	6.62	0.17	313.1	48.1*	24.7	27.2	Sandy Cl. L	12.1
	10-20	5.95	1.42	2.68	0.06	413.5	50.4	27.7	21.9	Sandy Cl. L	11.9
	20-30	6.10	1.71	1.47	0.05	254.0	57.6	19.8	22.6	Sandy Cl. L.	11.7
	30-40	6.00	1.65	2.07	0.06	336.7	57.6	17.8	24.6	Sandy Cl. L.	14.0
	40-50	6.01	1.72	1.55	0.04	295.4	49.6	22.8	27.6	Sandy Cl. L.	11.3
	50-60	6.10	1.82	1.04	0.03	251.1	40.6	29.8	29.6	Clay Loam	14.5
	60-70	6.01	1.77	1.21	0.06	259.9	45.3	27.8	26.9	Clay Loam	16.1
	70-80	6.05	1.75	0.86	0.05	295.4	44.3	25.8	29.9	Clay Loam	15.2
	80-90	6.05	1.68	0.69	0.04	200.8	44.3	29.8	25.9	Loam	13.9
2SF	0-10	6.00	1.15	16.90	0.60	330.8	17.8*	45.9	36.3	Silty Cl. L.	31.4
	10-20	5.58	1.51	3.45	0.12	295.4	14.9*	41.3	43.8	Silty Clay	23.1
	20-30	5.80	1.63	2.76	0.11	271.7	24.0	42.0	34.0	Clay Loam	20.3
	30-40	5.85	1.80	1.90	0.08	230.4	28.2	35.8	36.0	Clay Loam	20.4
	40-50	5.80	1.61	1.72	0.07	135.9	27.3	31.8	40.9	Clay	24.0
	50-60	6.10	1.59	1.90	0.05	177.3	25.8	35.4	38.8	Clay Loam	34.7
	60-70	5.95	1.54	1.21	0.03	236.3	21.8	35.5	42.7	Clay	36.0
	70-80	6.00	1.61	0.52	0.04	242.2	19.4	36.9	43.7	Clay	35.3
	80-90	6.10	1.52	0.52	0.03	183.1	20.4	38.0	41.6	Clay	36.4
3SF	0-10	5.69	1.26	5.63	0.12	401.7	6.0*	51.5	42.5	Silty Clay	16.07
	10-20	5.25	1.26	3.83	0.09	236.3	4.0*	54.6	41.4	Silty Clay	21.52
	20-30	4.88	1.46	2.59	0.07	200.9	17.4	44.0	38.6	Silty Cl. L.	17.84
	30-40	5.01	1.45	2.26	0.07	141.8	18.5	41.0	40.5	Silty Clay	19.50
	40-50	5.41	1.56	1.55	0.06	177.2	19.4	38.4	42.2	Clay	19.85
	50-60	5.55	1.56	0.88	0.05	124.1	22.4	35.6	42.0	Clay	26.35
	60-70	5.80	1.55	0.81	0.04	94.5	17.5	38.9	43.6	Clay	27.54
	70-80	5.78	1.40	0.64	0.04	118.1	21.5	37.9	40.6	Clay	32.05
	80-90	5.80	1.47	0.63	0.03	106.3	22.5	39.9	37.6	Clay Loam	33.11

* Pre-treated with 30% H_2O_2

Table 7. Analytical Data on Workman Creek Soils from Sample Pits. Samples Collected During the Month of June, 1965.

Pit Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Particle Size Analysis Sand %	Silt %	Clay %	Grade	Soil Moisture %
4SO	0-10	6.05	1.55	6.22	0.13	236.3	14.0*	47.6	38.4	Silty Cl. L.	12.12
	10-20	5.85	1.70	2.93	0.06	236.3	14.0	45.4	40.6	Silty Clay	16.18
	20-30	5.75	1.63	2.24	0.05	200.9	11.0	42.4	46.6	Silty Clay	23.90
	30-40	5.65	1.63	1.21	0.04	153.6	10.2	45.5	44.3	Silty Clay	29.77
	40-50	5.70	1.57	1.21	0.04	236.3	9.9	46.9	43.2	Silty Clay	31.54
	50-60	5.73	1.55	1.03	0.03	165.4	13.2	46.5	40.3	Silty Clay	32.46
	60-70	5.75	1.59	0.52	0.03	135.9	12.9	42.7	44.4	Silty Clay	31.60
	70-80	5.76	1.51	0.52	0.03	141.8	14.4	42.4	43.2	Silty Clay	36.38
	80-90	5.65	1.56	0.69	0.02	206.8	16.4	42.4	41.2	Silty Clay	33.45
5SO	0-10	6.00	1.27	6.02	0.16	259.9	11.0*	47.8	41.2	Silty Clay	16.4
	10-20	5.70	1.31	3.28	0.11	307.2	4.8*	50.4	44.8	Silty Clay	15.7
	20-30	5.50	1.36	2.24	0.08	218.2	14.1	45.6	40.3	Silty Clay	18.2
	30-40	5.41	1.47	1.90	0.06	254.9	11.1	45.2	43.7	Silty Clay	18.1
	40-50	5.49	1.63	1.21	0.06	236.3	14.1	43.7	42.2	Silty Clay	20.0
	50-60	5.67	1.63	0.69	0.03	129.9	18.2	34.6	47.2	Clay	22.2
	60-70	5.62	1.58	0.69	0.04	177.2	19.4	34.2	46.4	Clay	24.2
	70-80	5.65	1.58	0.35	0.02	180.2	29.4	32.2	38.4	Clay Loam	21.1
	80-90	5.72	1.60	0.35	0.01	194.9	42.4	28.4	29.2	Clay Loam	20.0

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* Pre-treated with 30% H_2O_2

Table 8. Analytical Data from Surface Foot of Workman Creek Soils

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
N4	0-10	6.32	1.38	15.31	0.39	354.4	22.4*	53.0*	24.6*	Silt Loam
	10-20	5.71	1.32	2.43	0.07	620.3	50.3	34.6	15.1	Loam
	20-30	5.00	1.31	2.15	0.03	183.1	50.7	34.2	15.1	Loam
N6	0-10	6.31		9.91	0.20	313.1	14.2*	48.2*	37.6*	Silty Clay Loam
	10-20	6.01	1.27	5.83	0.16	283.5	34.4	40.8	24.8	Loam
	20-30	5.95	1.38	3.40	0.10	242.2	27.3	45.5	27.2	Clay Loam
N14	0-10	5.71	1.48	6.62	0.23	224.5	26.0*	48.0*	26.0*	Loam
	10-20	5.40	1.56	3.02	0.11	413.5	50.0	36.8	13.2	Loam
	20-30	5.70	1.46	2.10	0.08	206.8	49.7	37.7	12.6	Loam
N22	0-10	6.25		14.60	0.47	301.3	10.4*	47.6*	42.0*	Silty Clay
	10-20	6.81	1.03	8.91	0.23	460.8	38.1	47.8	14.1	Loam
	20-30	6.70	1.11	8.16	0.24	348.5	36.1	48.6	15.3	Loam
N33	0-10	5.98	1.24	6.41	0.18	168.4	32.4*	31.8	35.8*	Clay Loam
	10-20	5.36	1.32	1.52	0.06	124.1	36.9	35.3	27.8	Clay
	20-30	5.35	1.31	1.57	0.05	76.8	40.6	36.6	22.8	Loam
N44	0-10	5.15	1.48	1.66	0.24	254.0	43.1	42.6	14.3	Loam
	10-20	5.30	1.38	2.72	0.09	200.8	43.9	36.8	19.3	Loam
	20-30	5.22	1.20	1.78	0.06	236.3	41.1	37.7	21.2	Loam
N48	0-10	4.85	1.71	12.79	0.42	1358.6	51.3	34.8	13.9	Loam
	10-20	5.33	1.34	4.07	0.13	407.6	40.8	39.4	19.8	Loam
	20-30	5.22	1.51	2.21	0.07	295.4	37.7	42.4	19.9	Loam

* Pre-treated with 30% H_2O_2

Table 8. Analytical Data from Surface Foot of Workman Creek Soils.

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
N56	0-10	5.99	1.58	14.79	0.31	354.4	14.2*	57.2*	28.6*	Silty Clay Loam
	10-20	5.95	1.65	7.17	0.19	330.8	16.4*	52.0*	31.6*	Silty Clay Loam
	20-30	5.40	1.48	2.50	0.11	218.6	26.6	55.0	18.4	Silt Loam
N60	0-10	5.55	1.48	4.26	0.07	236.3	48.4*	28.0*	23.6*	Sandy Clay Loam
	10-20	5.51	1.36	3.93	0.08	289.5	34.4*	33.2*	32.4*	Clay Loam
	20-30	5.55	1.36	3.75	0.10	386.9	32.4*	35.4*	32.2*	Clay Loam
N68	0-10	5.40	2.00	9.53	0.17	933.3	32.4*	40.4*	27.2*	Clay Loam
	10-20	5.40	1.45	3.40	0.09	410.6	49.8*	26.4*	23.8*	Sandy Clay Loam
	20-30	5.45	1.60	1.57	0.05	212.7	56.2	25.8	18.0	Sandy Loam
N74	0-10	5.50	1.25	17.47	0.37	206.8	23.6*	38.6*	37.8*	Clay Loam
	10-20	5.49	1.59	4.66	0.11	260.0	6.2*	26.8*	67.0*	Clay
	20-30	5.80		4.81	0.11	643.9	2.4*	26.6*	71.0*	Clay
N81	0-10	6.00	1.24	8.05	0.16	301.3	28.4*	45.6*	26.0*	Loam
	10-20	5.75	1.42	3.24	0.09	271.7	27.4*	44.6*	28.0*	Clay Loam
	20-30	5.60	1.55	2.57	0.06	200.8	67.8	18.5	13.7	Sandy Loam
N88	0-10	5.90		14.17	0.29	259.9	16.0*	56.0*	28.0*	Silty Clay Loam
	10-20	5.86	1.19	5.27	0.12	389.9	12.4*	52.8*	34.8*	Silty Clay Loam
	20-30	5.80	1.39	3.85	0.07	254.0	18.4*	45.8*	35.8*	Silty Clay Loam
N95	0-10	6.13	1.07	9.00	0.19	183.1	15.4	46.6*	38.0*	Silty Clay Loam
	10-20	5.92	1.24	4.59	0.13	235.3	10.6	43.8*	45.7*	Silty Clay
	20-30	4.93	1.45	3.12	0.09	230.4	11.6	43.8*	44.7*	Silty Clay

* Pre-treated with 30% H_2O_2

Table 8. Analytical Data from Surface Foot of Workman Creek Soils

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
N98	0-10	5.05	1.08	13.19	0.22	265.8	14.1*	60.1*	26.0*	Silt Loam
	10-20	5.18	1.36	3.98	0.12	218.6	11.1*	56.2*	32.8*	Silty Clay Loam
	20-30	4.93	1.84	6.63	0.11	254.0	13.1*	55.1*	32.0*	Silty Clay Loam
N107	0-10	6.77	1.14	18.12	0.50	401.7	22.0*	49.1*	29.0*	Clay Loam
	10-20	6.80	1.42	7.38	0.16	336.7	19.5*	46.1*	33.6*	Clay Loam
	20-30	6.62	1.50	5.16	0.14	372.2	17.5*	48.2*	34.3*	Silty Clay Loam
N116	0-10	6.00	1.16	11.47	0.31	490.3	18.1*	49.2*	32.8*	Silty Clay Loam
	10-20	5.88	1.17	7.93	0.20	519.8	18.0*	49.7*	32.3*	Silty Clay Loam
	20-30	6.07	1.31	4.03	0.12	304.2	18.0*	52.1*	30.0*	Silty Clay Loam
S2	0-10	6.49	1.44	6.33	0.21	366.2	48.1	38.0	14.9	Loam
	10-20	6.55	1.63	3.98	0.12	372.2	46.1	36.9	17.0	Loam
	20-30	5.78	1.74	1.05	0.05	183.1	34,8	38.4	26.8	Clay Loam
S5	0-10	7.00	1.32	18.52	0.37	484.4	38.7	38.7	22.6	Loam
	10-20	5.93		6.62	0.14	720.7	30.1	41.9	28.0	Clay Loam
	20-30	5.90	1.78	5.98	0.11	212.7	15.1	39.3	45.6	Clay
S10	0-10	6.28	1.27	7.50	0.18	360.3	48.6	38.7	13.7	Loam
	10-20	5.75	1.53	4.69	0.12	360.4	42.8	44.1	13.1	Loam
	20-30	5.74	1.78	2.97	0.08	236.3	40.9	35.5	23.6	Loam
S13	0-10	6.09	1.36	2.14	0.06	177.2	39.0	42.0	19.0	Loam
	10-20	5.83	1.39	1.71	0.06	236.3	31.0	46.6	22.4	Loam
	20-30	5.81	1.45	1.83	0.06	162.4	27.1	46.5	26.4	Loam

* Pre-treated with 30% H_2O_2

Table 8. Analytical Data from Surface Foot of Workman Creek Soils.

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
S18	0-10	5.77	1.53	11.59	0.18	254.0	64.0	25.0	11.0	Sandy Loam
	10-20	5.63	1.50	3.79	0.08	259.9	53.2	33.6	13.2	Sandy Loam
	20-30	5.88	1.60	1.86	0.05	141.8				
S27	0-10	5.85	1.36	6.35	0.17	206.8	41.4	41.9	16.7	Loam
	10-20	5.85	1.31	2.36	0.16	130.0	38.5	38.4	23.1	Loam
	20-30	5.76	1.72	1.57	0.03	153.6	34.5	38.3	27.2	Clay Loam
S31	0-10	5.70	1.73	8.25	0.22	209.7	31.2	41.0	27.8	Clay Loam
	10-20	5.50	1.20	5.90	0.11	289.5	25.5	44.6	29.9	Clay Loam
	20-30	5.60	1.44	6.26	0.13	183.1	27.3	44.6	28.1	Clay Loam
S41	0-10	6.20	1.56	14.47	0.20	342.6	39.8	14.1	46.1	Clay
	10-20	5.65	1.70	3.00	0.09	472.6	39.8	38.4	21.8	Loam
	20-30	5.50	1.75	5.40	0.08	183.1	42.0	34.5	23.5	Loam
S46	0-10	5.55	1.28	26.77	0.34	301.2	42.6	33.3	24.1	Loam
	10-20	4.70	1.03	7.02	0.14	282.1	33.1	34.7	32.2	Clay Loam
	20-30	5.05	1.73	5.14	0.13	301.3	30.5	35.5	34.0	Clay Loam
S54	0-10	5.90	1.66	23.24	0.53	478.5	42.3	39.6	18.1	Loam
	10-20	5.60	1.07	8.29	0.21	295.4	35.3	41.5	23.2	Loam
S58	0-10	6.15	1.08	10.85	0.23	419.4	34.4	47.6	18.0	Loam
	10-20	6.03	1.58	4.02	0.07	218.6	30.2	45.6	24.2	Loam
	20-30	6.04	1.62	1.79	0.12	212.7	31.2	41.8	27.0	Clay Loam

Table 8. Analytical Data from Surface Foot of Workman Creek Soils.

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
S68	0-10	6.01	1.43	11.40	0.25	286.5	39.0	44.1	16.9	Loam
	10-20	5.87	1.65	3.98	0.12	236.3	35.4	41.2	23.4	Clay Loam
	20-30	6.05		2.62	0.08	224.5	29.9	42.1	28.0	Clay Loam
S79	0-10	6.14	1.23	16.60	0.33	404.7	31.6	45.3	23.1	Loam
	10-20	5.95	1.47	4.14	0.10	242.2	32.0	28.6	39.4	Clay Loam
	20-30	6.00	1.73	2.45	0.07	248.1	28.8	39.4	31.8	Loam
S89	0-10	5.96	1.68	9.69	0.19	395.8	40.4	40.7	18.9	Loam
	10-20	5.82	1.34	2.78	0.07	200.8	27.9	37.0	35.1	Clay Loam
	20-30	5.52	1.94	2.66	0.07	200.8	22.2	37.5	40.3	Clay Loam
S101	0-10	5.33	1.35	15.00	0.24	307.2	34.0	45.0	21.0	Loam
	10-20	5.69	1.62	3.97	0.09	211.2	31.3	38.4	30.3	Clay Loam
	20-30	5.60	1.73	3.21	0.08	177.2	23.1	35.4	41.5	Clay Loam
S114	0-10	5.75		16.78	0.30	295.4	39.2	43.5	17.3	Loam
	10-20	5.40	1.24	4.52	0.12	372.2	37.4	42.7	19.9	Loam
	20-30	5.42	1.29	3.14	0.11	301.3	32.3	43.1	25.5	Loam
S123	0-10	5.75	1.27	6.17	0.11	236.3	39.9	37.4	22.7	Loam
	10-20	5.41	1.56	2.67	0.05	159.5	28.5	35.6	35.9	Clay Loam
	20-30	5.09	1.91	2.35	0.03	150.7	41.9	12.2	45.9	Clay
S132	0-10	5.70	1.33	7.43	0.12	324.9	15.4	62.0	22.6	Silt Loam
	10-20	5.70	1.37	3.72	0.07	165.4	34.6	35.4	30.0	Clay Loam
	20-30	5.61	1.72	2.22	0.05	206.7	34.7	32.7	32.6	Clay Loam

Table 8. Analytical Data from Surface Foot of Workman Creek Soils.

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
S140	0-10	5.30	1.72	2.15	0.15	189.0	16.3	57.9	25.8	Silt Loam
	10-20	5.10	1.79	4.28	0.08	194.9	29.2	43.0	27.8	Clay Loam
	20-30	5.04	1.83	4.38	0.06	189.0	35.3	34.7	30.0	Clay Loam
S143	0-10	5.75		7.81	0.20	366.2	28.2	49.3	22.5	Loam
	10-20	5.44	1.54	3.40	0.06	259.9	24.6	47.8	27.6	Clay Loam
	20-30	5.40	1.25	2.35	0.05	135.9	24.7	45.7	29.6	Loam
M1	0-10	6.68	1.71	5.64	0.14	307.2	14.5*	50.7*	34.8*	Silty Clay Loam
	10-20	5.92	1.16	4.64	0.13	206.8	13.5*	57.4*	29.1*	Silty Clay Loam
	20-30	5.54	1.34	3.76	0.10	236.3	11.5*	51.7*	36.8*	Silty Clay Loam
M3	0-10	5.24	1.96	4.62	0.13	189.0	16.9*	52.9*	30.2*	Silty Clay Loam
	10-20	5.15	1.87	2.90	0.07	165.4	12.4	36.0	51.6	Clay
	20-30	5.05	1.92	3.12	0.04	135.9	00.0	24.4	75.6	Clay
M7	0-10	6.10	1.40	8.85	0.24	183.1	10.3	58.1	31.6	Silty Clay Loam
	10-20	6.00	1.34	6.33	0.20	180.2	8.3	54.1	37.6	Silty Clay Loam
	20-30	6.00	1.44	5.14	0.19	177.2	9.8	51.6	38.6	Silty Clay Loam
M12	0-10	6.01	1.03	10.62	0.31	165.4	8.8	63.7	27.5	Silty Clay Loam
	10-20	6.10	1.13	9.68	0.27	183.1	8.8	63.2	28.0	Silty Clay Loam
	20-30	6.41	1.21	8.04	0.18	189.0	7.8	58.7	33.5	Silty Clay Loam
M19	0-10	5.80	1.23	9.97	0.24	307.2	12.8	51.7	35.5	Silty Clay Loam
	10-20	5.60	1.17	6.52	0.14	206.8	8.4	54.2	37.4	Silty Clay Loam
	20-30	5.30	1.22	4.26	0.09	159.5	3.4	47.3	49.3	Silty Clay

* Pre-treated with 30% H_2O_2

Table 8. Analytical Data from Surface Foot of Workman Creek Soils.

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
M28	0-10	6.10	1.15	9.24	0.23	236.3	6.8	55.4	37.8	Silty Clay Loam
	10-20	6.00	1.20	7.39	0.19	206.8	7.8	53.4	38.8	Silty Clay Loam
	20-30	6.01	1.23	7.26	0.14	206.8	5.8	52.4	41.8	Silty Clay
M39	0-10	6.84	1.13	16.57	0.19	200.8	11.8	50.6	37.6	Silty Clay Loam
	10-20	5.88	1.62	5.68	0.15	171.3	9.3	46.1	44.6	Silty Clay
	20-30	5.86	1.48	4.07	0.12	165.4	5.8	44.6	49.6	Silty Clay
M54	0-10	6.55	1.24	10.36	0.25	254.0	11.8	56.6	31.6	Silty Clay Loam
	10-20	6.10	1.26	6.09	0.16	206.8	11.8	51.6	36.6	Silty Clay Loam
	20-30	5.75	1.38	5.02	0.14	206.8	11.9	49.5	38.6	Silty Clay Loam
M70	0-10	6.85	1.04	10.38	0.23	360.3	20.8	48.6	30.6	Clay Loam
	10-20	6.45	1.17	6.13	0.15	301.3	17.9	50.6	31.5	Silty Clay Loam
	20-30	6.36	1.50	5.14	0.13	289.5	16.9	47.7	35.4	Silty Clay Loam
M89	0-10	6.50		12.38	0.15	502.1	27.4	35.8	36.8	Clay Loam
	10-20	5.40	1.12	7.75	0.16	336.7	16.4	37.9	45.7	Clay
	20-30	5.61	1.45	4.98	0.11	183.1	18.4	31.5	50.1	Clay
M109	0-10	6.05	1.28	6.22	0.16	141.8	30.4	36.9	32.7	Clay Loam
	10-20	5.90	1.27	4.90	0.11	165.4	29.4	35.9	34.7	Clay Loam
	20-30	5.88	1.31	3.72	0.09	177.2	31.4	37.0	31.6	Clay Loam
M131	0-10	5.62		15.50	0.26	206.8	47.4	24.0	28.6	Sandy Clay Loam
	10-20	5.58	1.23	6.67	0.17	206.8	35.4	34.6	30.0	Clay Loam
	20-30	5.54	1.63	2.67	0.08	206.8	34.4	32.0	32.6	Clay Loam

Table 8. Analytical Data from Surface Foot of Workman Creek Soils.

Sample Site	Depth (cm)	pH	Bulk Density	Organic Matter %	Total Nitrogen %	Total Soluble Salt-ppm	Sand %	Silt %	Clay %	Grade
M152	0-10	5.46		11.40	0.22	206.8	25.4	46.0	28.6	Clay Loam
	10-20	5.35	1.12	8.44	0.17	295.4	24.4	45.2	30.4	Clay Loam
	20-30	5.65	1.45	4.28	0.10	236.3	28.2	46.6	25.2	Loam
M167	0-10	6.11	1.53	4.81	0.13	200.9	31.8	36.6	31.6	Clay Loam
	10-20	5.95	1.56	5.11	0.14	165.4	29.4	36.4	34.2	Clay Loam
	20-30	5.72	1.64	5.02	0.14	194.9	32.6	34.2	33.2	Clay Loam

Table 9. Dispersion Percentages of the Surface Foot of Soil in the Three Drainages of Upper Workman Creek.

Sample Location	Sample Depth (inches)	Dispersed Silt+Clay (gms/liter)	Non-Dispersed Silt+Clay (gms/liter)	Dispersion Percentage
N-4	0-4	23.3	15.4	66
	4-8	24.3	18.4	76
	8-12	24.2	18.6	77
N-6	0-4	29.3	9.6	33
	4-8	31.2	11.4	37
	8-12	34.7	13.9	40
N-14	0-4	24.3	10.4	43
	4-8	24.3	13.1	54
	8-12	24.7	13.0	53
N-22	0-4	26.7	17.6	66
	4-8	30.2	12.1	40
	8-12	30.9	12.1	39
N-33	0-4	25.0	10.7	43
	4-8	30.4	17.6	58
	8-12	28.4	16.4	58
N-44	0-4	27.4	14.5	53
	4-8	27.4	19.0	70
	8-12	28.9	19.0	66
N-48	0-4	23.4	11.5	49
	4-8	28.9	12.0	42
	8-12	30.4	12.5	41
N-56	0-4	31.5	10.0	32
	4-8	35.3	15.1	43
	8-12	35.9	19.6	55
N-60	0-4	19.1	12.6	66
	4-8	28.1	14.6	52
	8-12	29.6	13.2	44
N-68	0-4	22.9	9.3	41
	4-8	23.5	13.2	56
	8-12	21.2	13.7	65
N-74	0-4	26.5	11.2	44
	4-8	36.2	12.2	34
	8-12	39.0	16.7	43
N-81	0-4	16.7	10.6	64
	4-8	17.2	12.2	71
	8-12	15.7	13.6	87
N-88	0-4	24.7	13.2	54
	4-8	28.7	13.7	48
	8-12	-	9.6	-

Table 9. Dispersion Percentages of the Surface Foot of Soil in the Three Drainages of Upper Workman Creek.

Sample Location	Sample Depth (inches)	Dispersed Silt+Clay (gms/liter)	Non-Dispersed Silt+Clay (gms/liter)	Dispersion Percentage
N-95	0-4	26.7	14.4	54
	4-8	30.2	14.0	46
	8-12	30.2	17.9	59
N-98	0-4	27.2	14.4	52
	4-8	30.2	15.0	50
	8-12	31.2	15.9	51
N-107	0-4	19.2	12.5	65
	4-8	23.2	11.0	47
	8-12	27.2	11.0	40
N-116	0-4	22.2	11.5	52
	4-8	20.7	12.0	58
	8-12	18.7	12.5	67
M-1	0-4	35.5	16.8	47
	4-8	36.5	17.3	47
	8-12	38.5	17.3	45
M-3	0-4	33.1	14.7	44
	4-8	37.6	16.5	44
	8-12	50.1	22.3	45
M-7	0-4	39.7	16.1	41
	4-8	41.7	14.1	34
	8-12	40.2	14.6	36
M-12	0-4	41.2	20.6	50
	4-8	41.2	17.1	42
	8-12	42.2	14.6	35
M-19	0-4	37.2	15.1	41
	4-8	41.6	12.1	29
	8-12	46.6	12.6	25
M-28	0-4	43.2	13.1	30
	4-8	42.2	12.2	29
	8-12	44.2	13.2	30
M-39	0-4	38.2	13.7	36
	4-8	43.1	21.2	49
	8-12	44.2	19.2	44
M-54	0-4	38.2	10.2	27
	4-8	38.2	12.2	33
	8-12	38.1	12.7	33

Table 9. Dispersion Percentages of the Surface Foot of Soil in the Three Drainages of Upper Workman Creek.

Sample Location	Sample Depth (inches)	Dispersed Silt+Clay (gms/liter)	Non-Dispersed Silt+Clay (gms/liter)	Dispersion Percentage
M-70	0-4	29.2	8.4	29
	4-8	32.1	9.2	29
	8-12	33.1	11.2	34
M-89	0-4	36.3	9.7	27
	4-8	41.8	9.8	23
	8-12	40.8	10.1	25
M-109	0-4	34.8	16.1	46
	4-8	35.3	12.9	37
	8-12	34.3	15.7	46
M-131	0-4	26.3	9.2	35
	4-8	32.3	11.0	34
	8-12	32.3	15.0	47
M-152	0-4	37.3	13.2	35
	4-8	37.8	15.0	40
	8-12	35.9	19.0	53
M-169	0-4	34.1	20.5	60
	4-8	35.3	19.0	54
	8-12	33.7	17.0	51
S-2	0-4	25.2	16.0	64
	4-8	25.7	18.8	73
	8-12	30.7	20.6	67
S-5	0-4	28.7	16.8	59
	4-8	32.7	16.8	51
	8-12	40.2	20.3	51
S-10	0-4	24.2	7.3	30
	4-8	26.7	9.2	34
	8-12	28.3	14.3	50
S-13	0-4	29.8	25.4	85
	4-8	33.3	21.8	66
	8-12	35.3	21.8	62
S-18	0-4	17.3	12.8	74
	4-8	22.3	15.3	69
	8-12	24.8	17.3	70
S-27	0-4	27.3	14.4	53
	4-8	28.8	17.4	60
	8-12	30.8	15.9	52

Table 9. Dispersion Percentages of the Surface Foot of Soil in the Three Drainages of Upper Workman Creek.

Sample Location	Sample Depth (inches)	Dispersed Silt+Clay (gms/liter)	Non-Dispersed Silt+Clay (gms/liter)	Dispersion Percentage
S-31	0-4	38.3	17.4	45
	4-8	39.8	19.4	49
	8-12	38.8	18.7	48
S-41	0-4	32.3	17.9	55
	4-8	31.8	18.4	58
	8-12	30.8	20.4	66
S-46	0-4	29.8	14.9	50
	4-8	35.3	15.4	44
	8-12	36.8	12.4	34
S-54	0-4	30.3	15.1	50
	4-6	34.8	14.2	41
S-58	0-4	34.9	20.2	58
	4-8	37.5	20.2	54
	8-12	37.0	16.7	45
S-68	0-4	32.5	12.2	38
	4-8	35.0	22.7	65
	8-12	35.0	20.7	59
S-79	0-4	35.5	13.7	39
	4-8	36.5	21.2	58
	8-12	38.0	19.2	52
S-89	0-4	31.5	19.1	61
	4-8	38.0	17.0	45
	8-12	40.5	22.5	56
S-101	0-4	34.5	20.5	60
	4-8	36.5	20.8	57
	8-12	40.0	20.5	51
S-114	0-4	32.0	17.0	53
	4-8	33.5	21.2	63
	8-12	36.0	24.7	69
S-123	0-4	32.0	23.7	74
	4-8	38.8	22.2	57
	8-12	40.5	22.2	55
S-132	0-4	40.1	22.7	57
	4-8	36.1	21.3	59
	8-12	39.1	17.8	46

Table 9. Dispersion Percentages of the Surface Foot of Soil in the Three Drainages of Upper Workman Creek.

Sample Location	Sample Depth (inches)	Dispersed Silt+Clay (gms/liter)	Non-Dispersed Silt+Clay (gms/liter)	Dispersion Percentage
S-140	0-4	39.6	18.3	46
	4-8	33.6	17.3	52
	8-12	30.6	16.3	53
S-143	0-4	34.1	22.8	67
	4-8	36.1	24.3	67
	8-12	36.1	25.3	70
1-NO	0-4	27.0	12.7	47
	4-8	27.9	13.2	47
	8-12	32.1	14.7	46
2-NF	0-4	39.8	9.9	25
	4-8	42.8	9.4	22
	8-12	40.1	11.4	28
3-NO	0-4	38.9	12.4	32
	4-8	38.4	14.9	39
	8-12	37.0	14.9	40
4-NF	0-4	33.9	11.4	34
	4-8	36.9	10.0	27
	8-12	35.9	13.8	39
5-NO	0-4	26.5	13.6	51
	4-8	29.6	17.1	59
	8-12	29.1	18.1	62
6-NF	0-4	29.0	11.9	41
	4-8	34.6	18.4	53
	8-12	34.6	20.4	59
1-MO	0-4	43.0	13.4	31
	4-8	41.0	14.4	35
	8-12	43.0	12.4	29
2-MF	0-4	24.4	8.9	36
	4-8	27.9	12.4	45
	8-12	29.1	15.1	52
3-MO	0-4	35.9	19.1	53
	4-8	36.4	17.1	47
	8-12	36.3	13.6	38.
4-MF	0-4	42.6	13.9	33
	4-8	41.1	11.4	28
	8-12	43.0	16.6	39

Table 9. Dispersion Percentages of the Surface Foot of Soil in the Three Drainages of Upper Workman Creek.

Sample Location	Sample Depth (inches)	Dispersed Silt+Clay (gms/liter)	Non-Dispersed Silt+Clay (gms/liter)	Dispersion Percentage
5-MF	0-4	47.1	17.6	37
	4-8	47.3	12.4	26
	8-12	48.6	11.9	25
6-MF	0-4	38.5	12.4	32
	4-8	39.5	14.4	37
	8-12	32.7	16.6	51
1-SF	0-4	26.0	7.1	27
	4-8	24.8	8.1	33
	8-12	21.2	8.6	41
2-SF	0-4	50.0	14.6	29
	4-8	42.6	15.4	36
	8-12	38.0	12.4	33
3-SF	0-4	47.0	22.1	47
	4-8	48.0	21.1	44
	8-12	41.3	19.1	46
4-SO	0-4	43.0	14.1	33
	4-8	43.0	18.6	43
	8-12	44.5	19.6	44
5-SO	0-4	44.5	15.1	34
	4-8	47.6	17.1	36
	8-12	43.0	18.1	42

Table 10 Available Soil Nutrients in Surface 4-inches of Workman Creek Soils as Determined by the Neubauer Method

Sample Site	Concentration in Percent					Concentration in Parts per Million				
Location No.	P	K	Ca	Mg	Na	Fe	B	Cu	Zn	Mn
North Fork										
Pits										
1 NO	1.27	4.91	0.89	0.51	0.20	273.49	14.32	42.47	165.70	489.06
2 NF	0.96	5.74	0.40	0.30	0.06	174.59	7.40	14.63	85.63	133.02
3 NO	1.42	6.64	0.75	0.39	0.15	232.96	15.96	16.50	118.36	111.19
4 NF	1.22	6.29	0.41	0.33	0.07	164.41	8.61	12.77	106.38	94.78
5 NO	1.09	4.49	0.62	0.40	0.12	131.35	10.00	29.66	98.88	283.15
6 NF	1.09	5.30	0.54	0.38	0.09	139.28	24.00	10.37	82.26	296.37
Middle Fork										
Pits										
1 MO	1.07	5.64	0.67	0.44	0.09	143.57	9.84	14.15	97.26	198.94
2 MF	1.00	4.02	0.54	0.37	0.09	132.36	8.83	14.95	88.32	379.30
3 MO	1.25	5.14	0.68	0.46	0.08	150.33	11.45	11.83	84.88	154.32
4 MF	1.15	5.90	0.64	0.38	0.09	139.26	9.54	13.08	91.12	227.27
5 MF	0.95	6.77	0.47	0.35	0.08	141.19	8.73	12.95	89.29	137.36
6 MF	0.79	5.79	0.42	0.36	0.08	129.77	8.89	13.19	87.91	169.83
South Fork										
Pits										
1 SF	1.24	5.92	0.69	0.34	0.09	137.25	7.63	15.10	76.34	225.60
2 SF	0.80	7.02	0.56	0.37	0.08	193.33	9.06	17.91	111.93	92.59
3 SF	0.92	4.19	0.52	0.34	0.06	162.00	4.38	8.77	60.03	230.61
4 SO	0.95	5.95	0.69	0.43	0.07	112.95	0.24	13.69	89.29	148.81
5 SO	1.10	4.85	0.47	0.35	0.13	120.67	12.40	14.63	104.93	174.88
Checks										
CN 1	1.11	2.24	0.39	0.50	0.19	148.93	10.20	10.55	75.67	56.18
CS 1	1.28	2.71	0.43	0.57	0.20	122.58	12.60	9.04	83.98	45.22
Average:	1.20	2.48	0.41	0.54	0.20	135.76	11.40	9.80	79.83	50.70

Table 10. Available Soil Nutrients in Surface 4-inches of Workman Creek Soils as Determined by the Neubauer Method

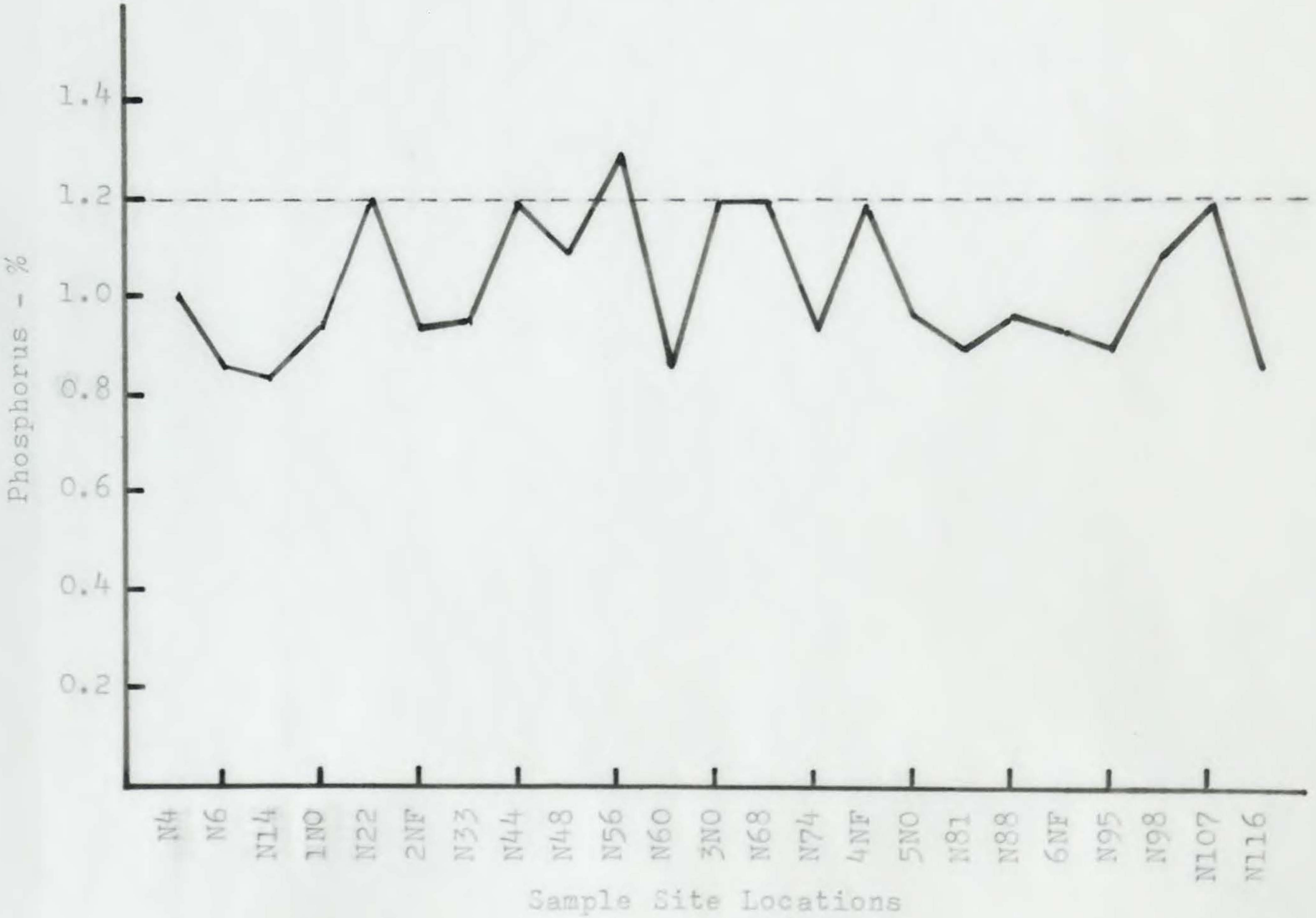
Sample Site	Concentration in Percent					Concentration in Parts per Million				
Location No.	P	K	Ca	Mg	Na	Fe	B	Cu	Zn	Mn
N4	1.12	5.33	0.66	0.34	0.06	164.67	8.62	14.92	94.92	78.46
N6	0.96	5.74	0.61	0.38	0.07	152.33	11.65	15.77	92.29	171.15
N14	0.90	3.91	0.70	0.37	0.07	148.59	8.92	6.41	75.50	423.24
N22	1.28	6.16	0.52	0.31	0.08	136.27	16.95	16.19	111.74	108.90
N33	1.11	4.98	0.67	0.40	0.06	106.39	4.63	7.85	65.88	238.30
N44	1.24	5.89	0.47	0.31	0.04	145.08	7.60	11.27	83.63	153.61
N48	1.18	8.53	0.49	0.33	0.03	150.54	6.38	9.46	78.85	144.09
N56	1.47	6.74	0.73	0.37	0.06	135.97	11.76	12.16	112.32	93.82
N60	0.98	5.93	0.56	0.44	0.08	145.96	8.12	12.04	93.96	323.85
N68	1.35	6.92	0.61	0.36	0.06	130.21	8.92	9.22	72.17	212.51
N74	0.98	6.15	0.49	0.33	0.05	137.44	6.44	11.29	79.57	115.74
N81	1.07	6.38	0.68	0.36	0.08	149.55	12.96	13.16	77.77	159.52
N88	1.04	6.18	0.61	0.32	0.07	152.33	7.98	15.77	98.57	89.61
N95	0.97	6.47	0.51	0.30	0.07	142.81	10.92	11.09	78.97	109.21
N98	1.16	6.57	0.50	0.34	0.07	155.27	10.64	11.00	89.65	155.39
N107	1.15	5.16	0.64	0.37	0.06	103.10	7.06	10.48	69.84	134.92
N116	0.94	5.60	0.55	0.36	0.07	129.79	7.22	14.28	103.02	146.01

Table 1Q. Available Soil Nutrients in Surface 4-inches of Workman Creek Soils as Determined by the Neubauer Method

Sample Site	Concentration in Percent					Concentration in Parts per Million				
Location No.	P	K	Ca	Mg	Na	Fe	B	Cu	Zn	Mn
S2	0.96	5.67	0.57	0.30	0.08	116.91	9.18	13.61	77.32	139.18
S5	0.86	5.98	0.87	0.35	0.07	156.41	8.48	14.35	95.65	98.91
S10	0.90	5.34	0.66	0.41	0.07	147.61	10.11	10.46	75.00	204.55
S13	0.98	6.55	1.00	0.44	0.15	180.71	10.95	4.76	123.81	504.76
S18	1.21	4.17	0.60	0.38	0.07	149.90	9.27	13.75	107.29	166.67
S27	0.84	4.26	0.59	0.37	0.08	124.36	8.30	9.79	70.21	191.49
S31	0.82	4.90	0.60	0.34	0.07	135.31	7.08	9.58	81.25	177.08
S41	1.07	4.84	0.60	0.39	0.06	113.08	8.57	10.11	85.71	153.85
S46	0.81	5.00	0.51	0.42	0.06	170.21	3.51	9.79	96.81	106.38
S54	0.91	6.91	0.71	0.42	0.08	151.32	6.77	12.06	107.35	88.09
S58	0.73	6.39	0.54	0.33	0.06	133.24	8.24	8.52	72.22	129.63
S68	0.88	5.89	0.53	0.33	0.05	153.99	7.07	11.96	76.99	99.64
S79	0.88	5.50	0.61	0.48	0.08	129.77	8.89	13.19	97.90	61.94
S89	0.88	4.27	0.50	0.33	0.05	117.88	4.17	11.98	68.06	136.12
S101	0.86	6.37	0.48	0.36	0.05	140.61	7.36	10.92	94.29	144.75
S114	1.13	5.38	0.60	0.39	0.06	205.28	8.70	12.90	104.59	117.30
S123	0.95	5.21	0.53	0.42	0.09	173.86	6.84	8.33	89.23	171.03
S132	1.11	4.89	0.52	0.45	0.15	159.85	15.83	9.96	101.35	144.03
S140	1.13	6.02	0.62	0.41	0.06	149.83	5.90	11.79	76.90	179.44
S143	0.84	5.39	0.65	0.42	0.06	137.29	9.41	13.95	96.17	179.67

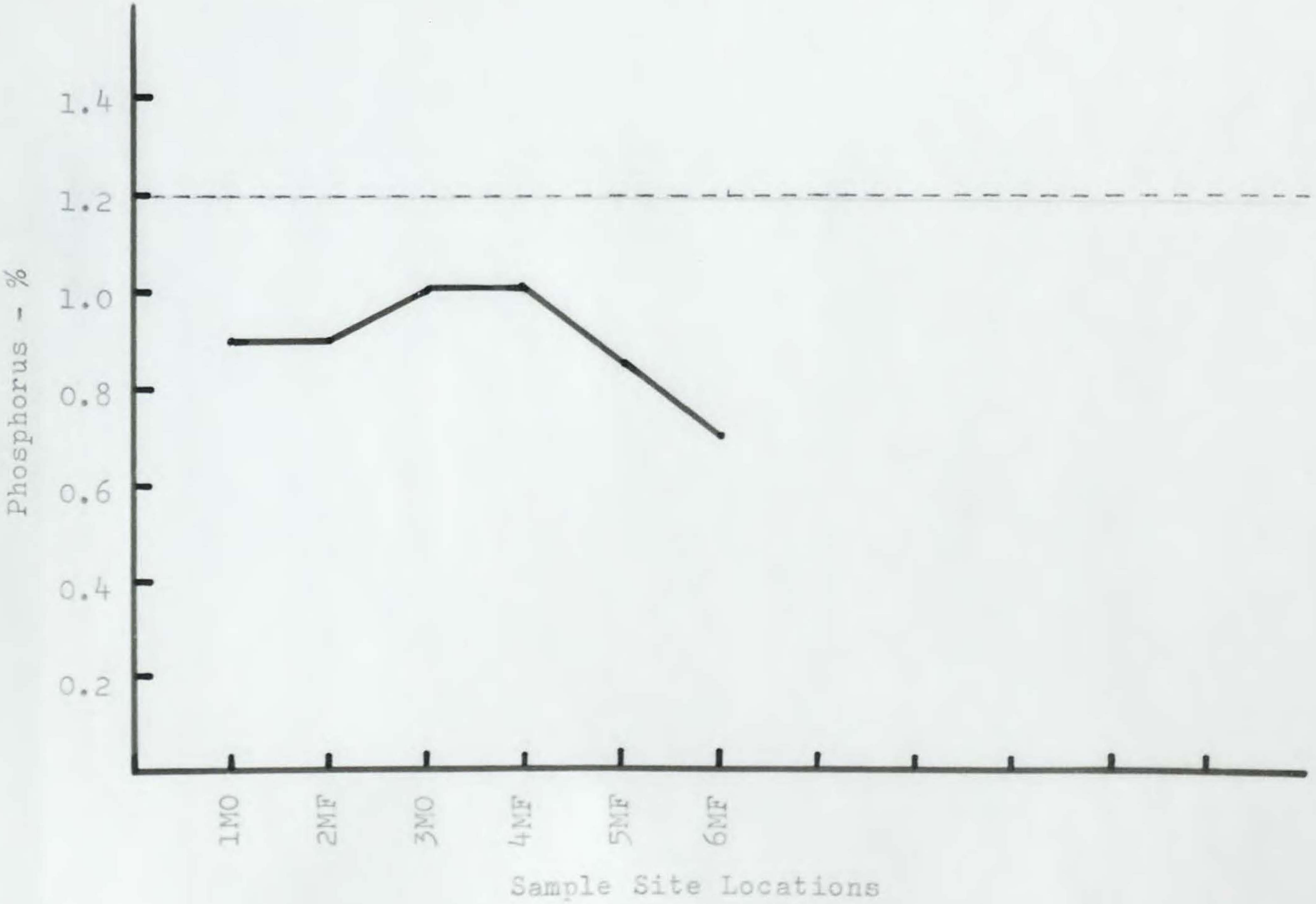
NEUBAUER TEST

Available P in Surface 4" of North Fork Soils



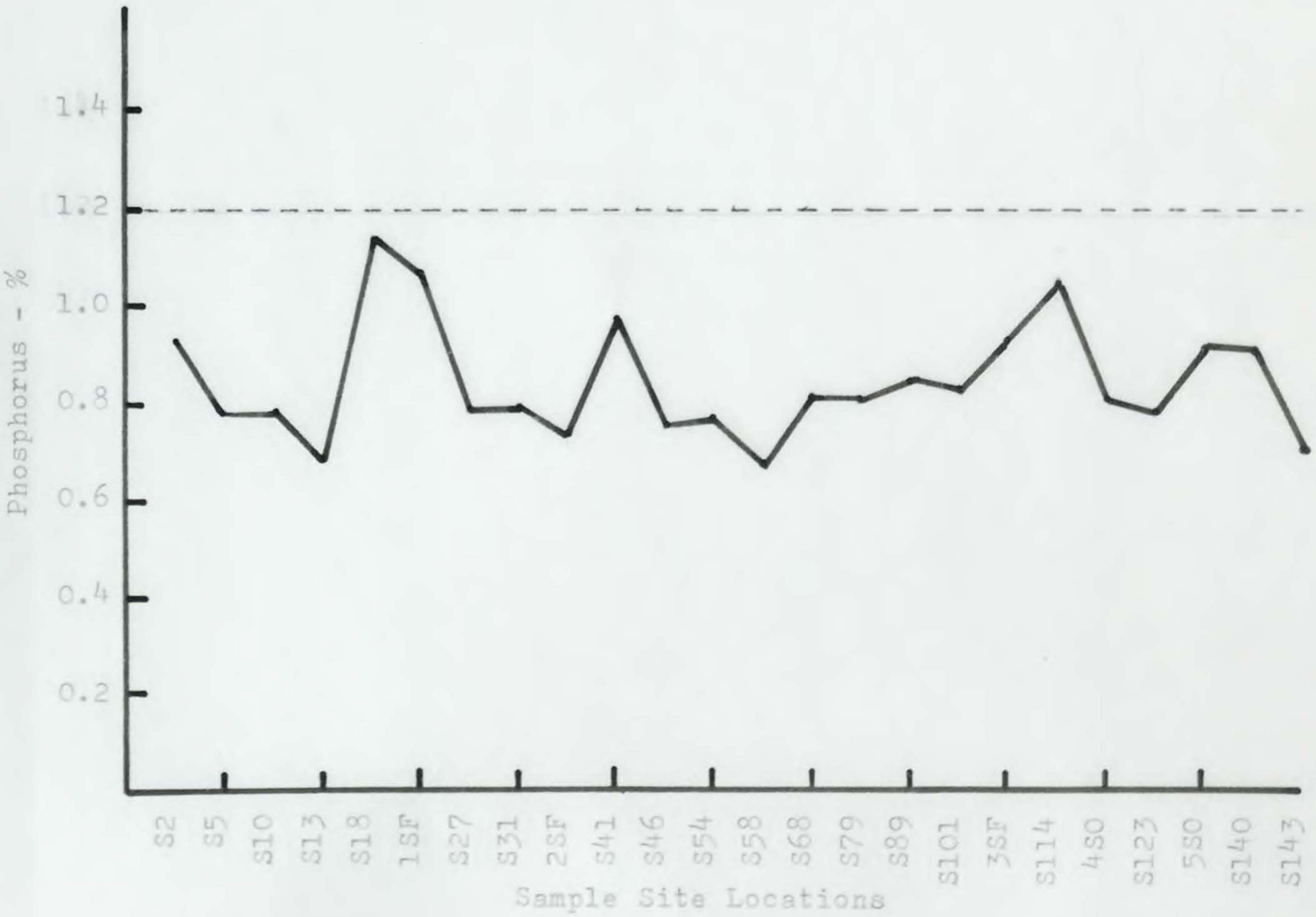
NEUBAUER TEST

Available P in Surface 4" of Middle Fork Soils



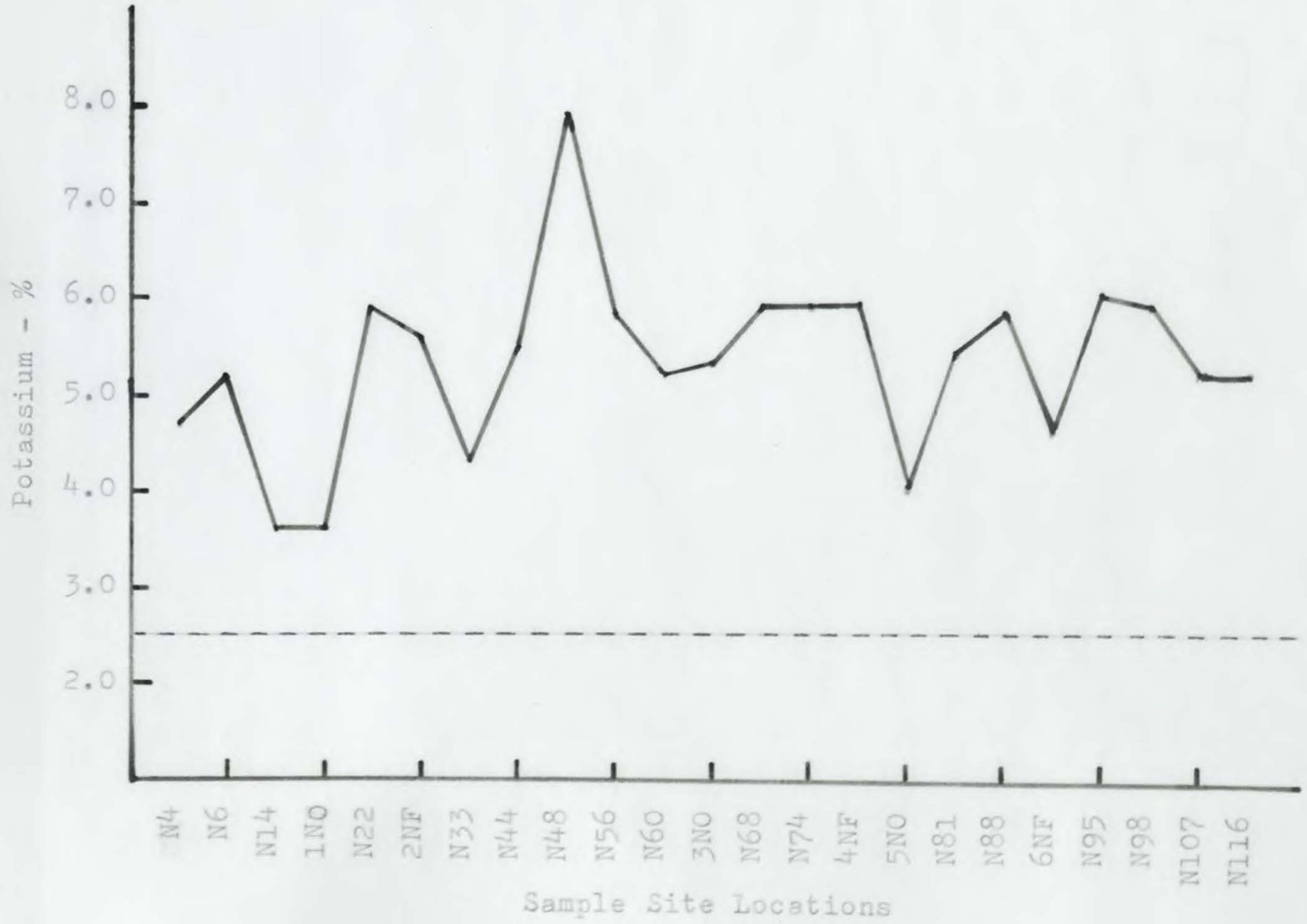
NEUBAUER TEST

Available P in Surface 4" of South Fork Soils



NEUBAUER TEST

Available K in Surface 4" of North Fork Soils



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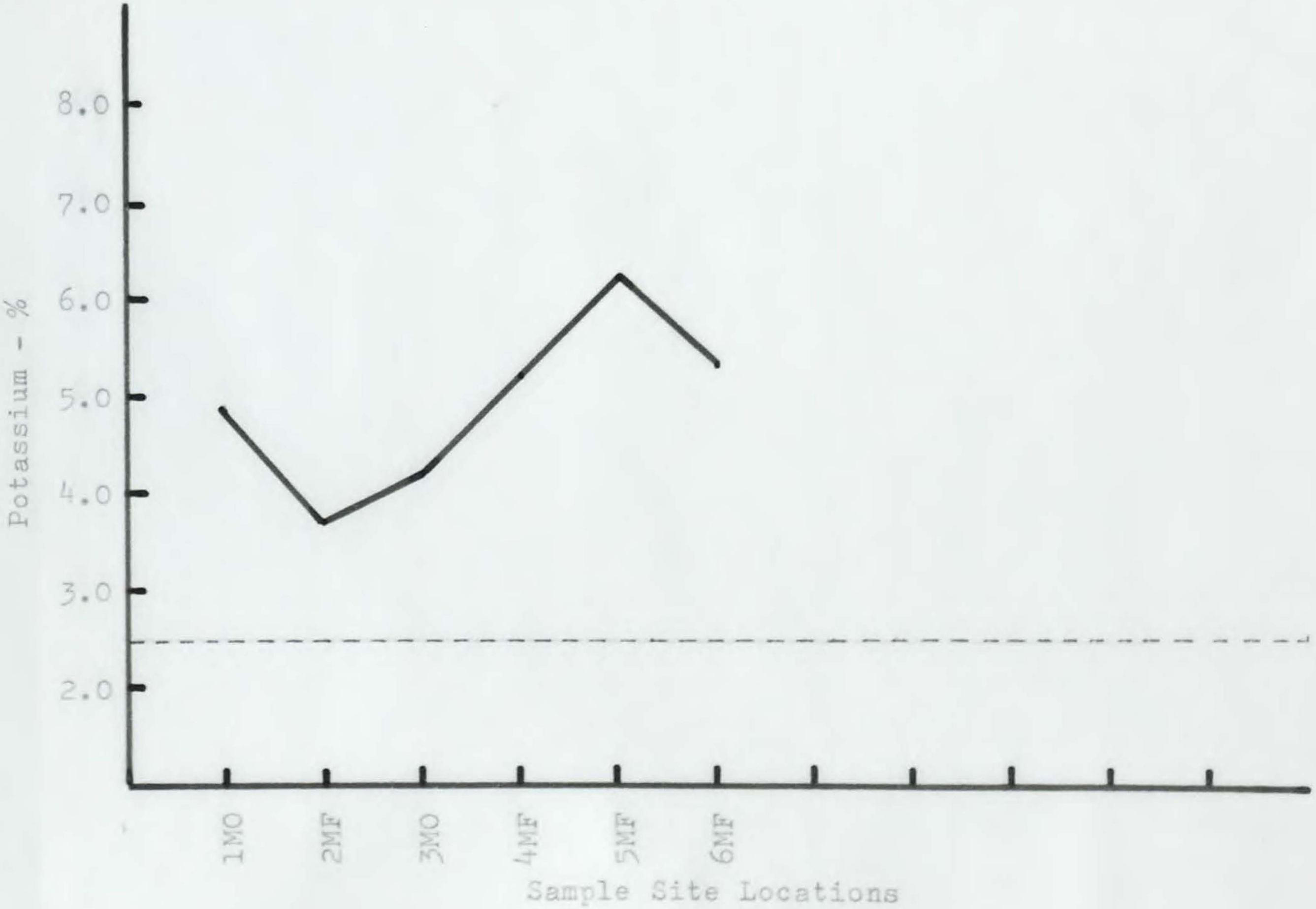

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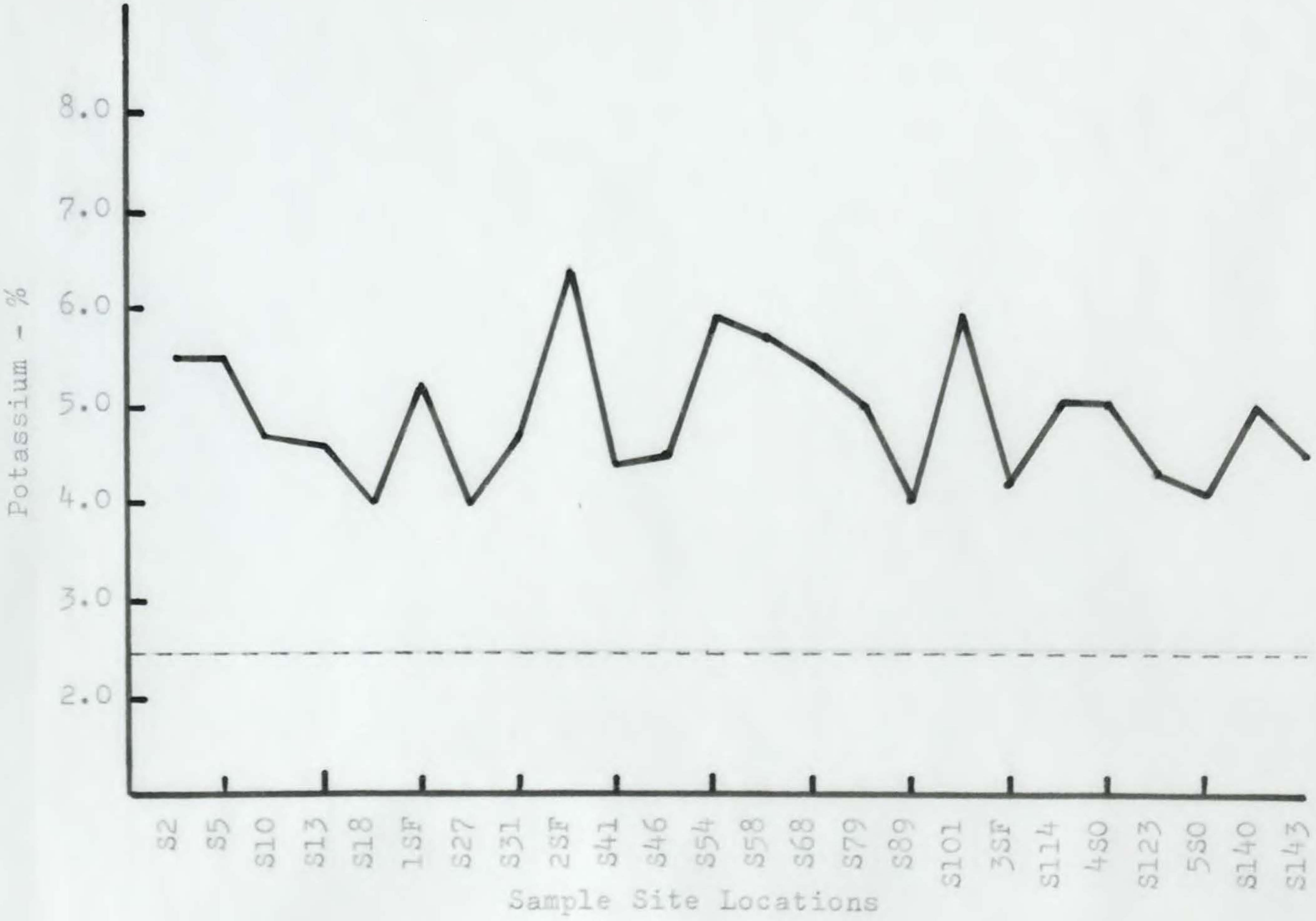

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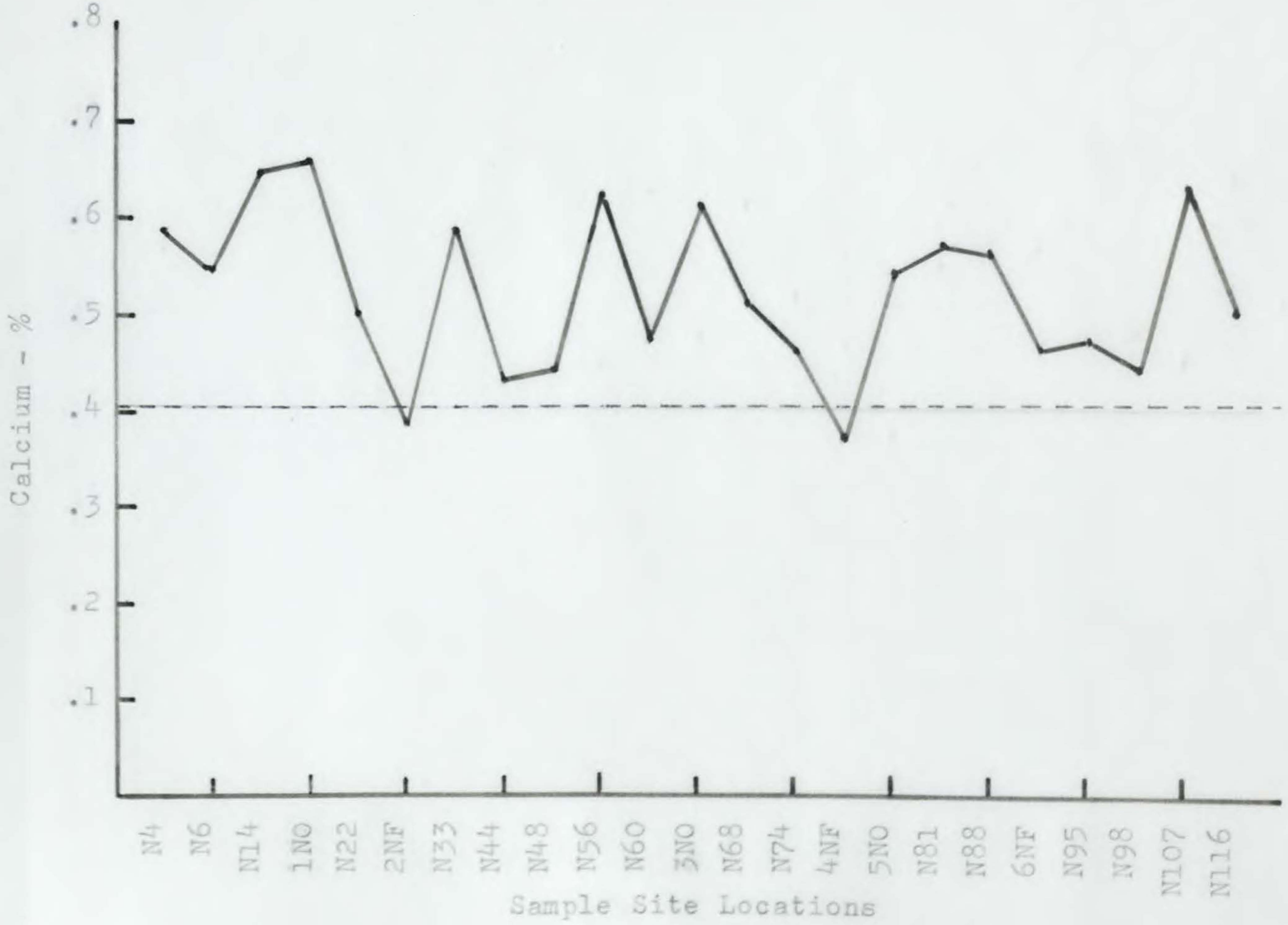
Available Ca in Surface 4" of North Fork Soils



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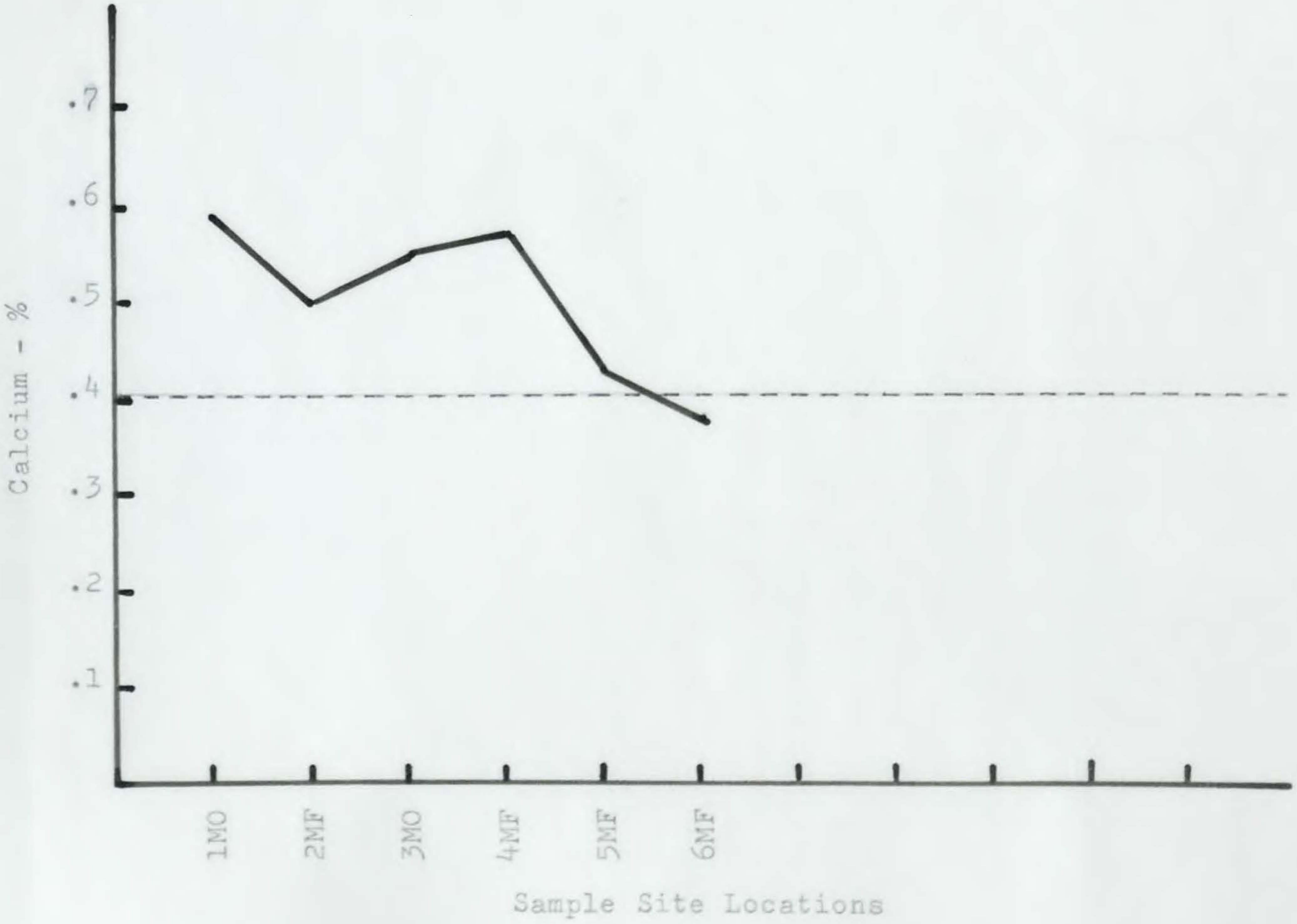

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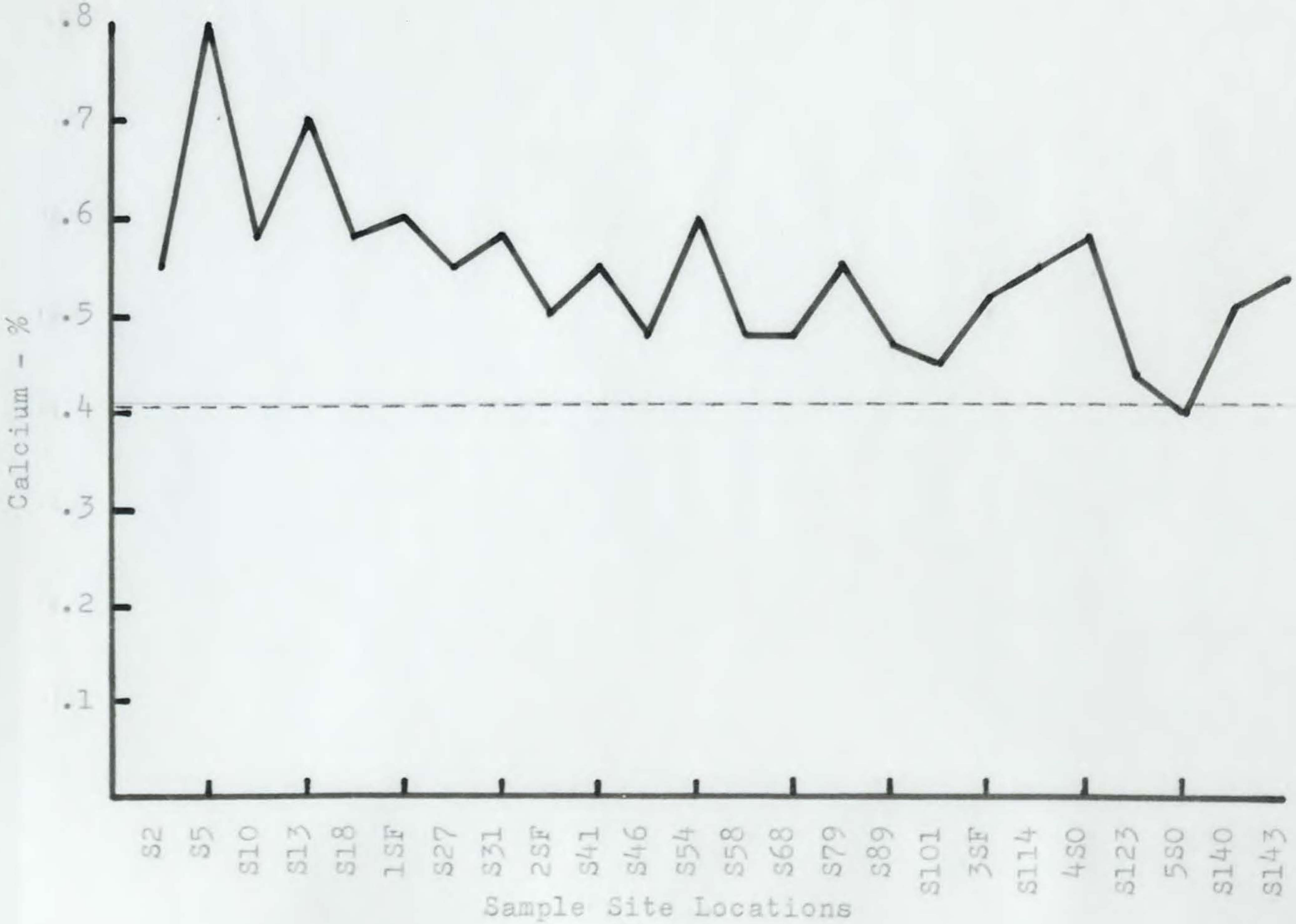

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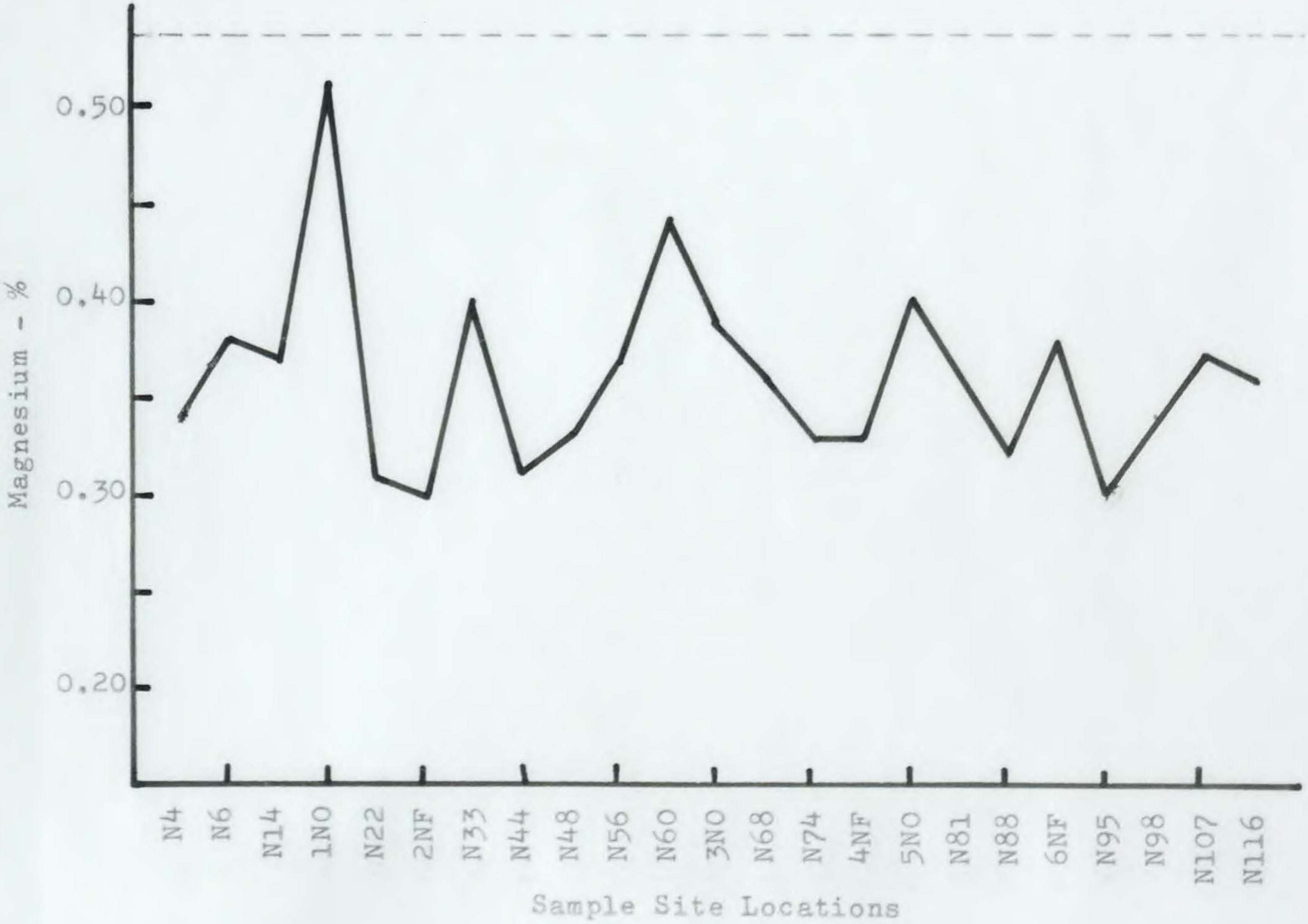
Available Mg in Surface 4" of North Fork Soils



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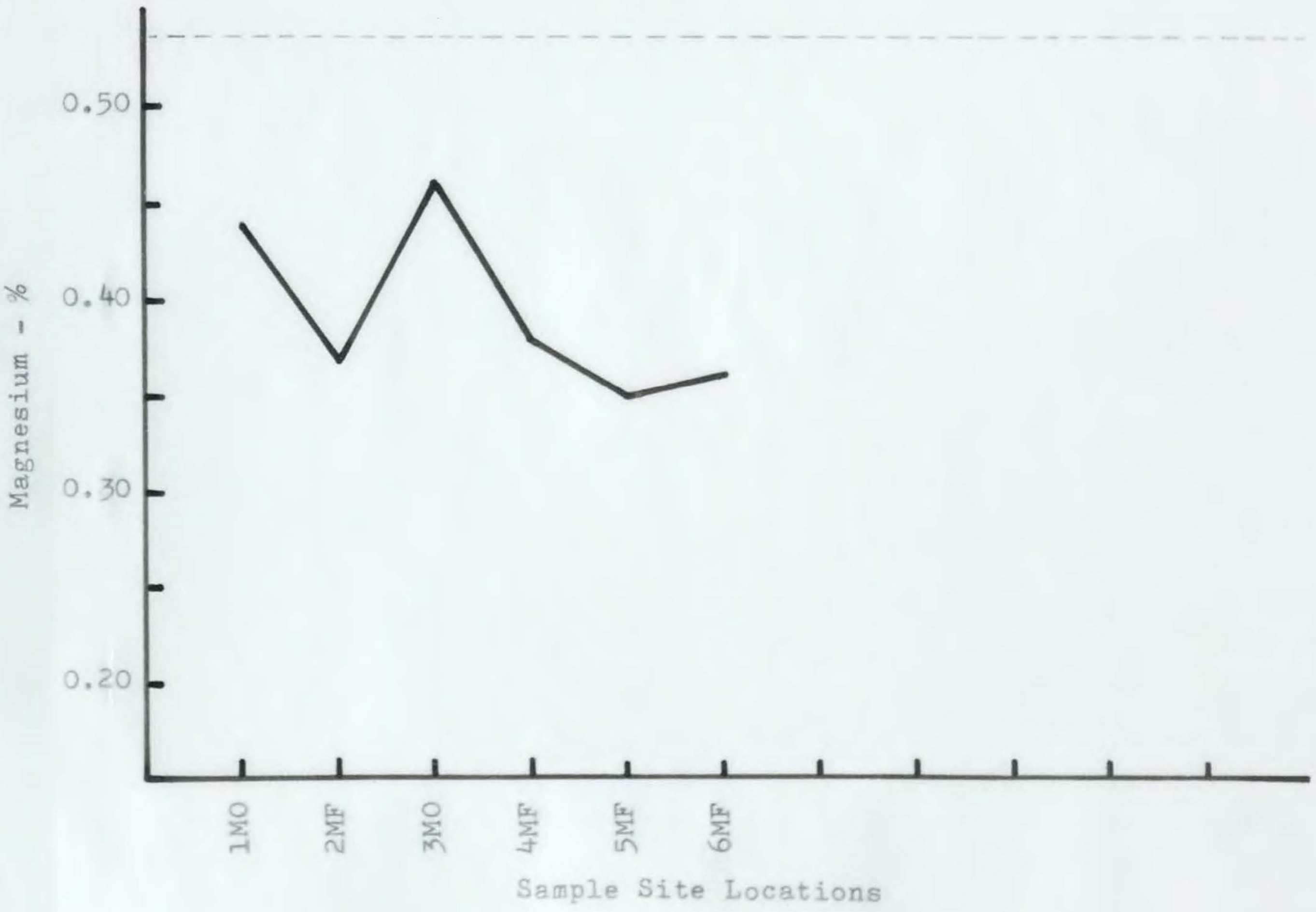

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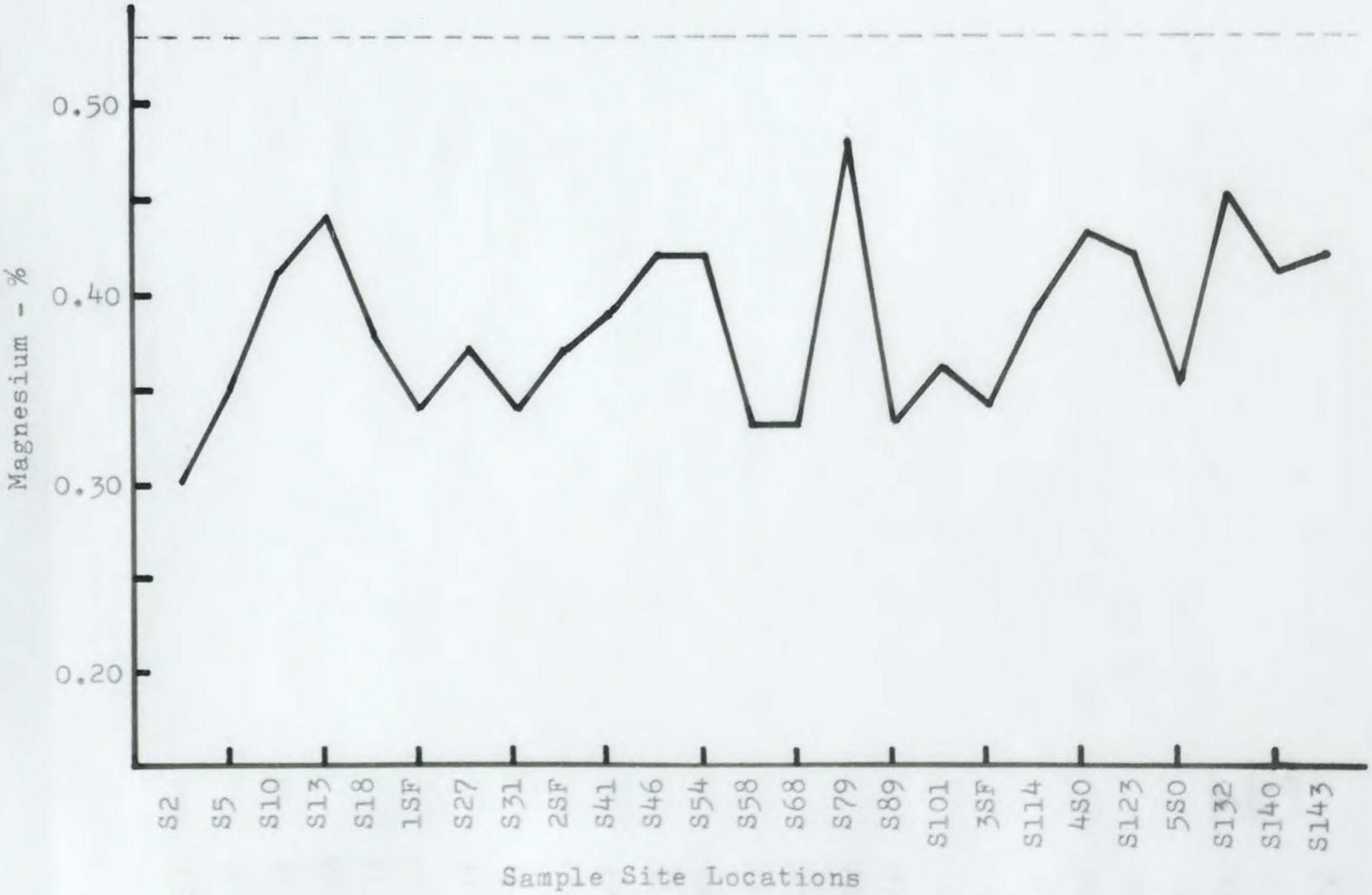

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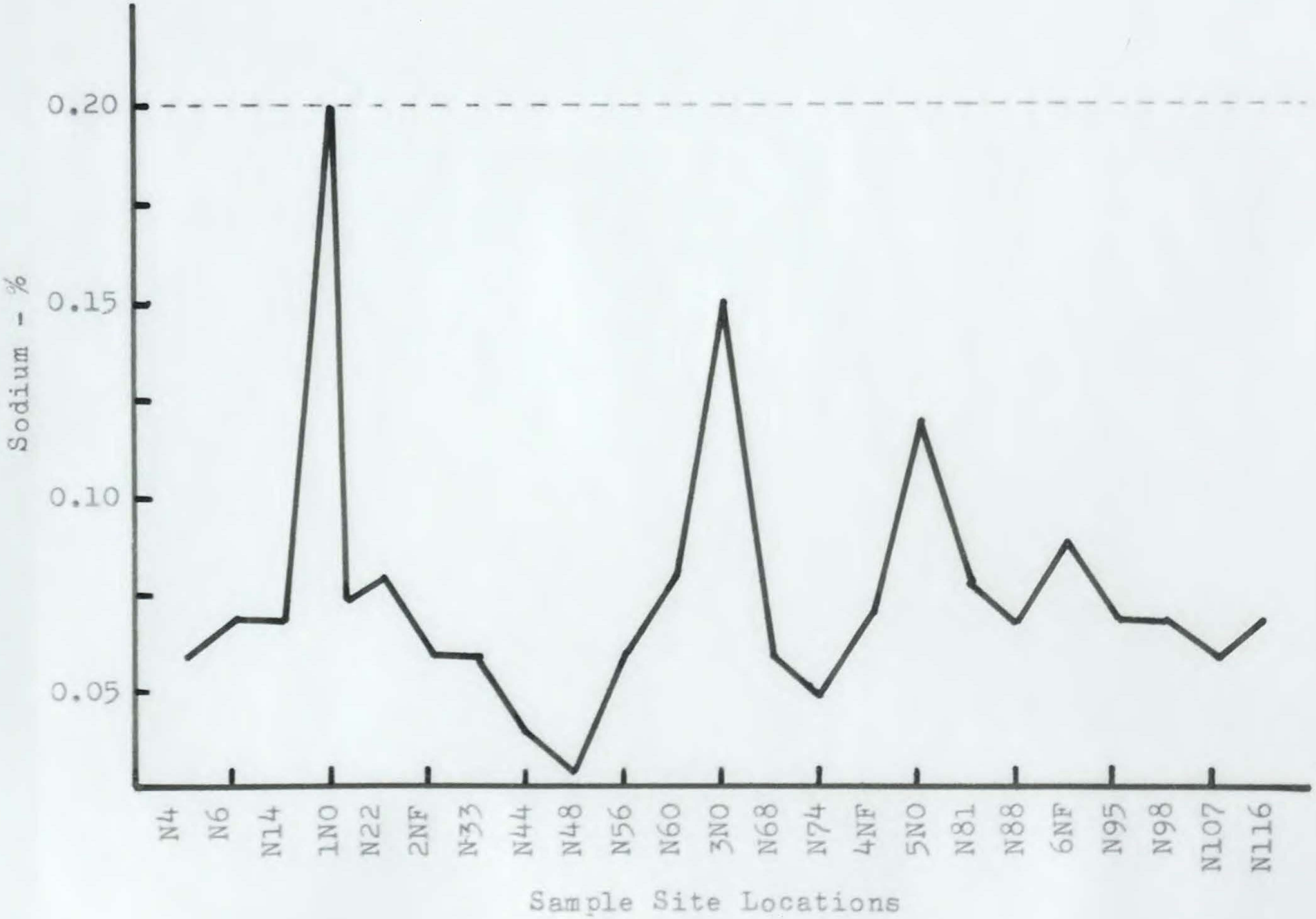

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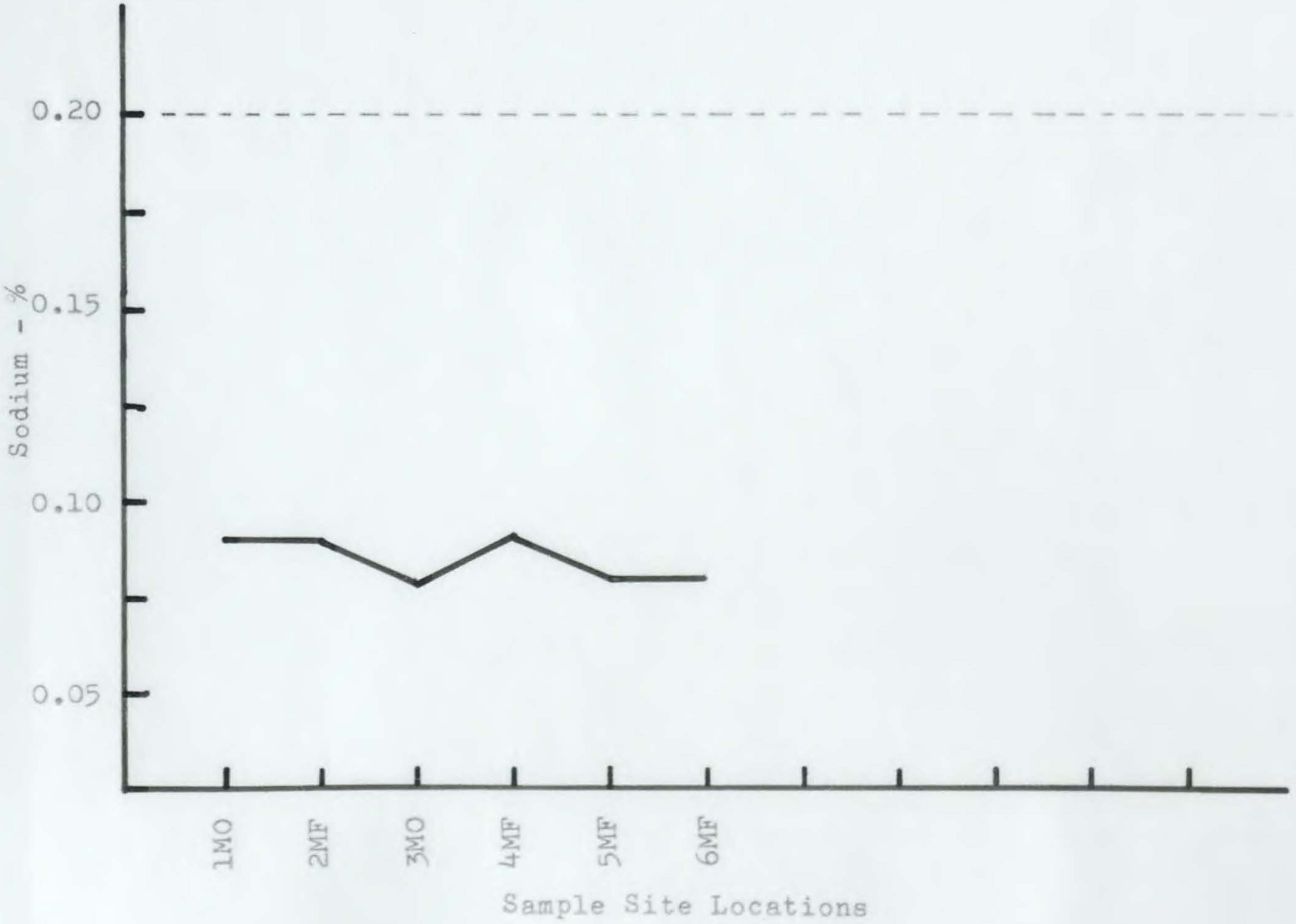

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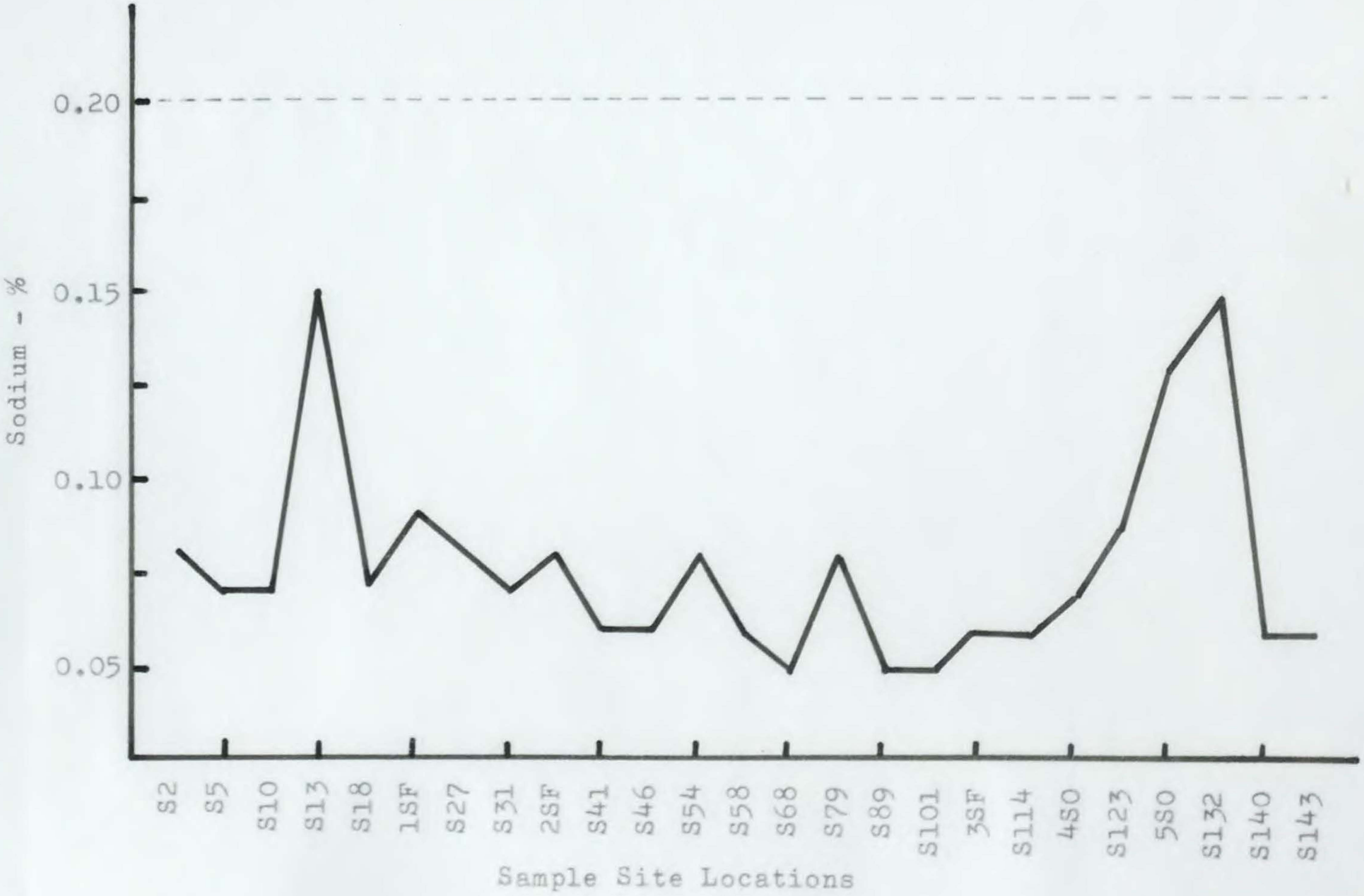
Available Na in Surface 4" of South Fork Soils



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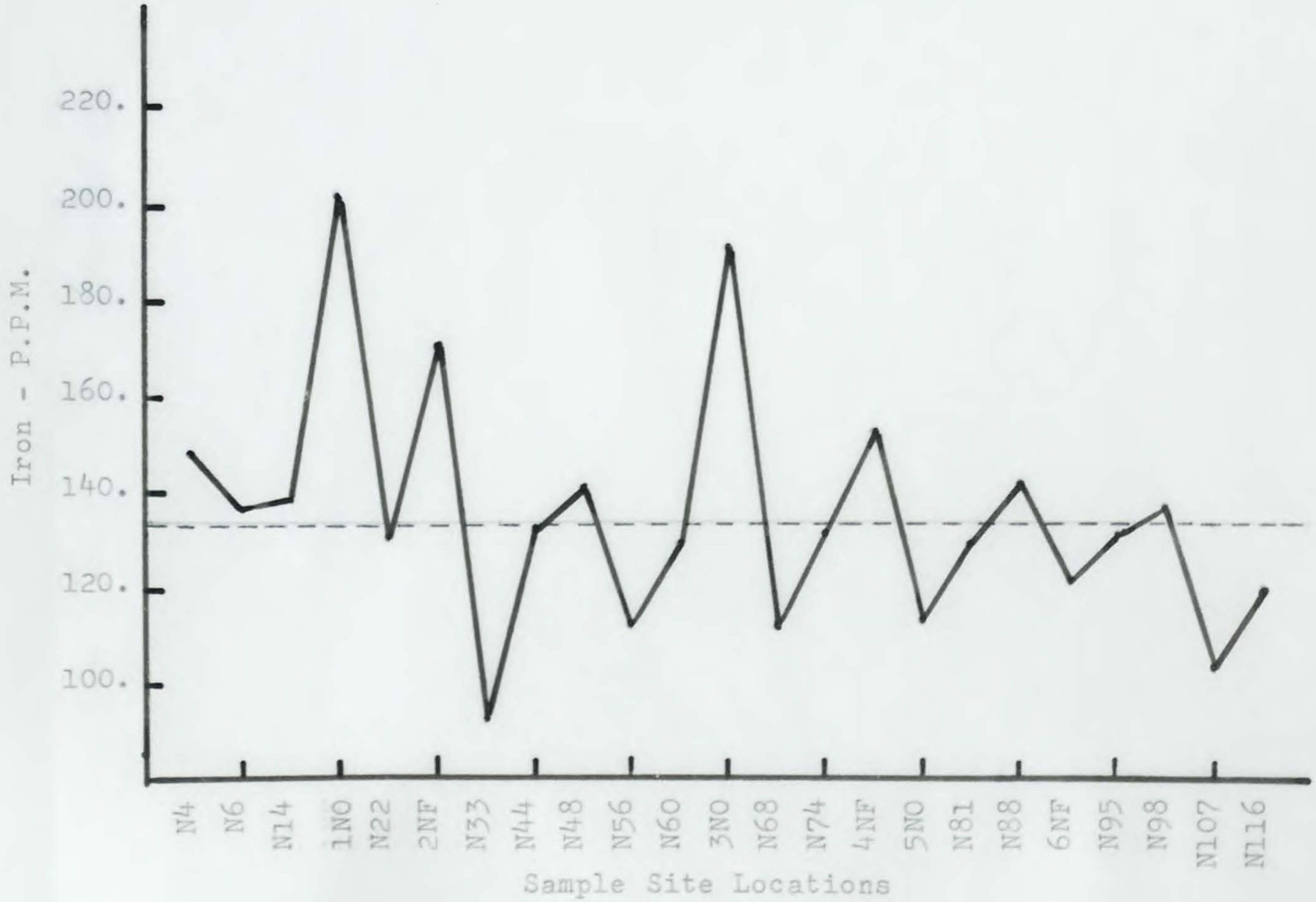

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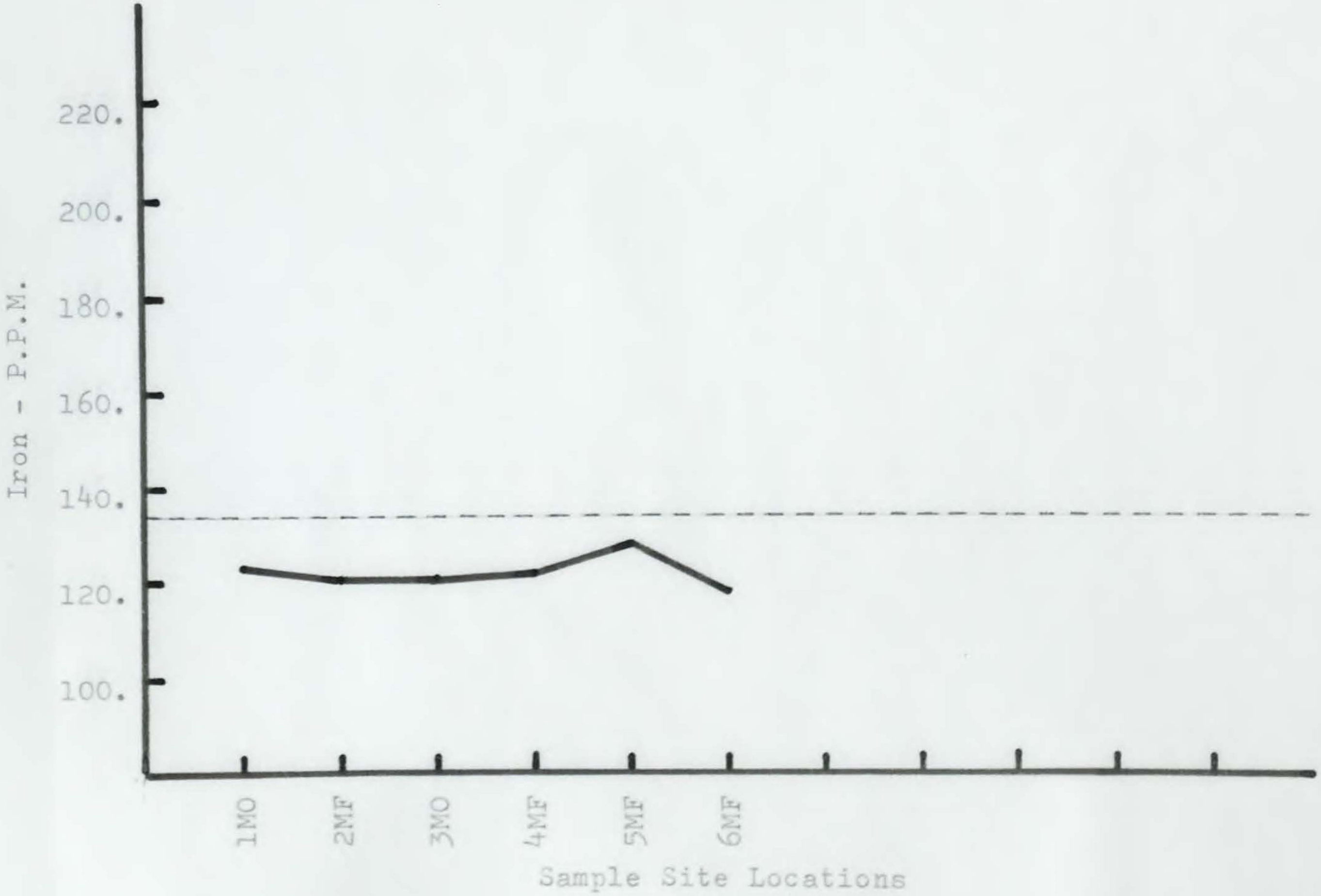

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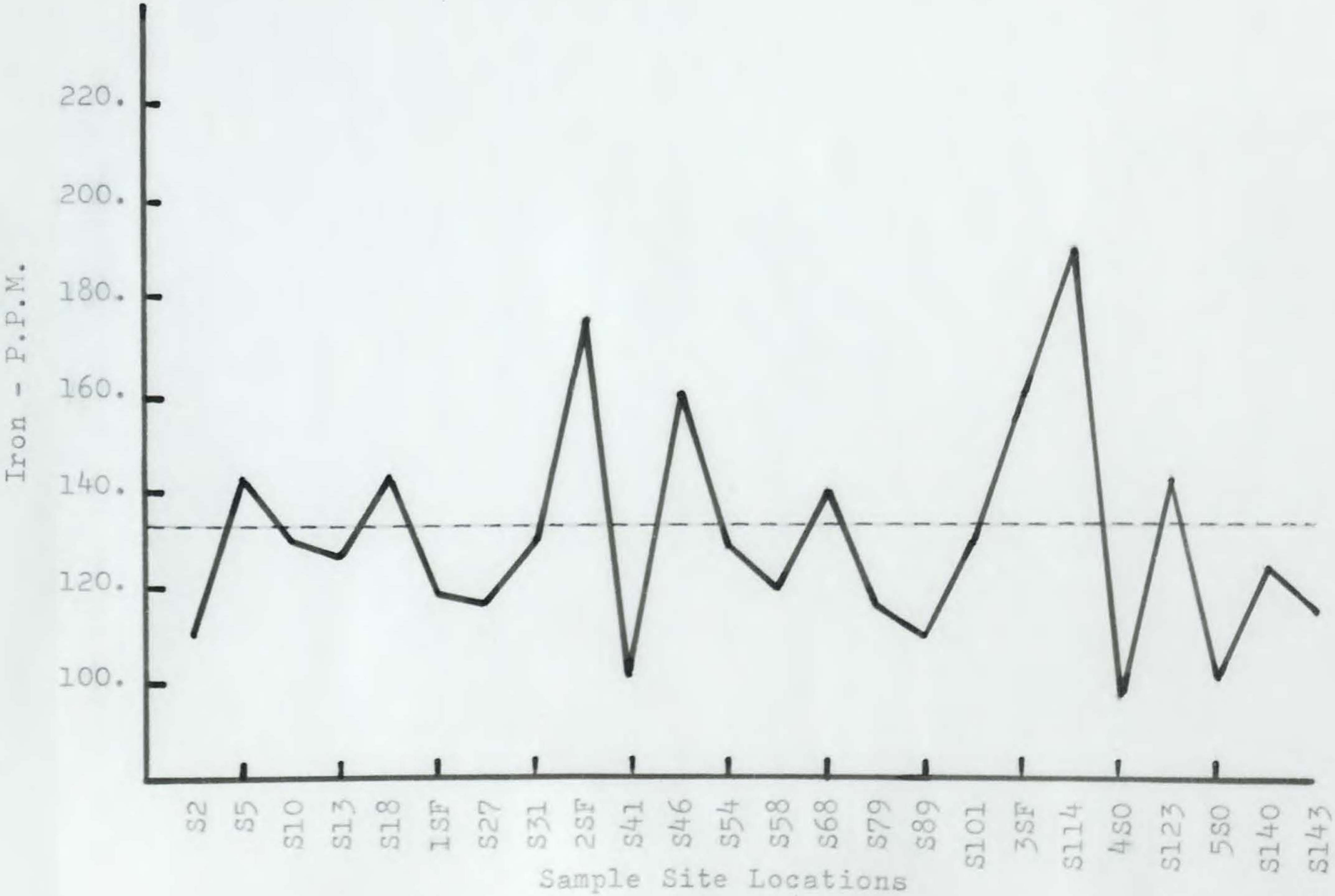

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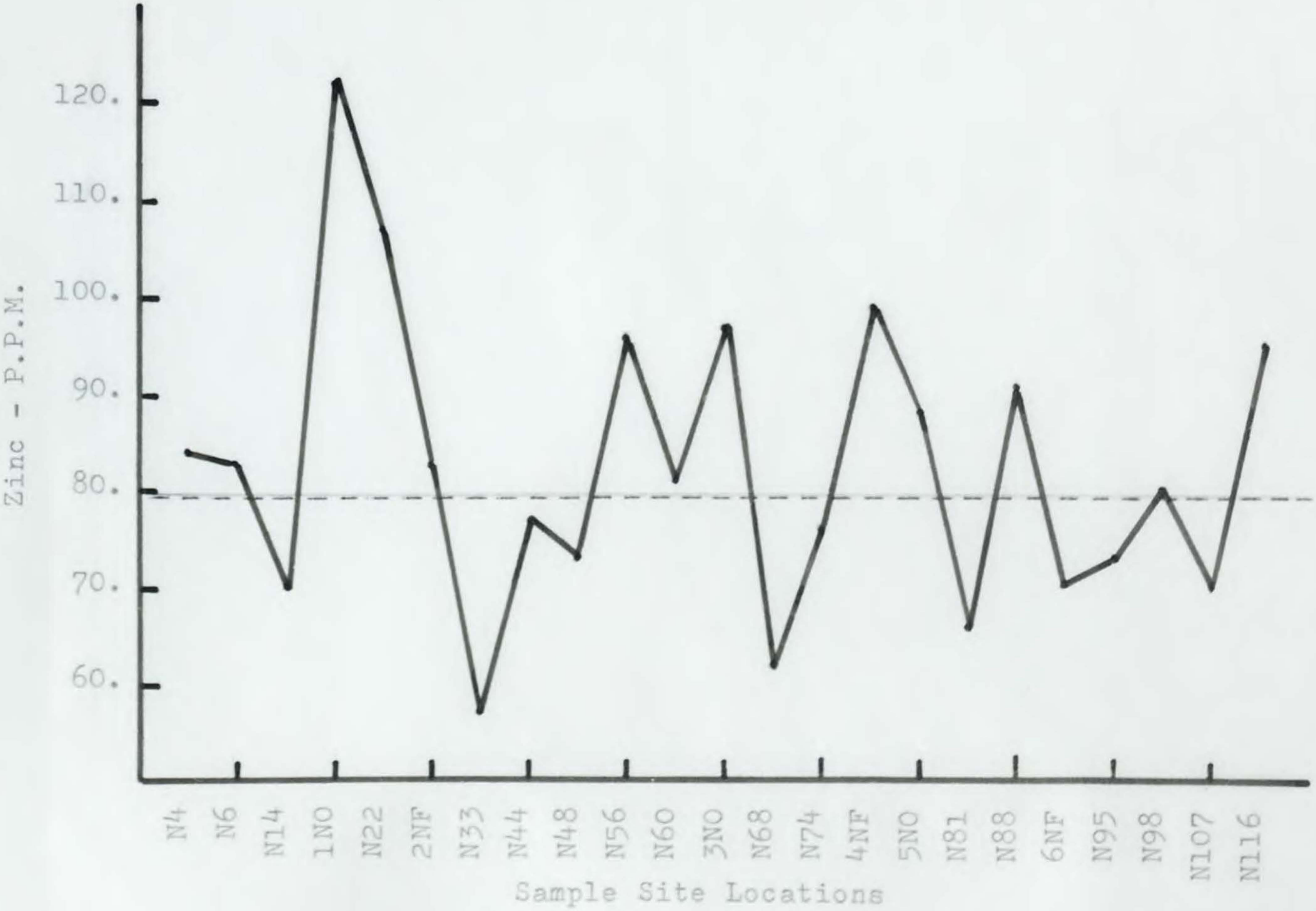

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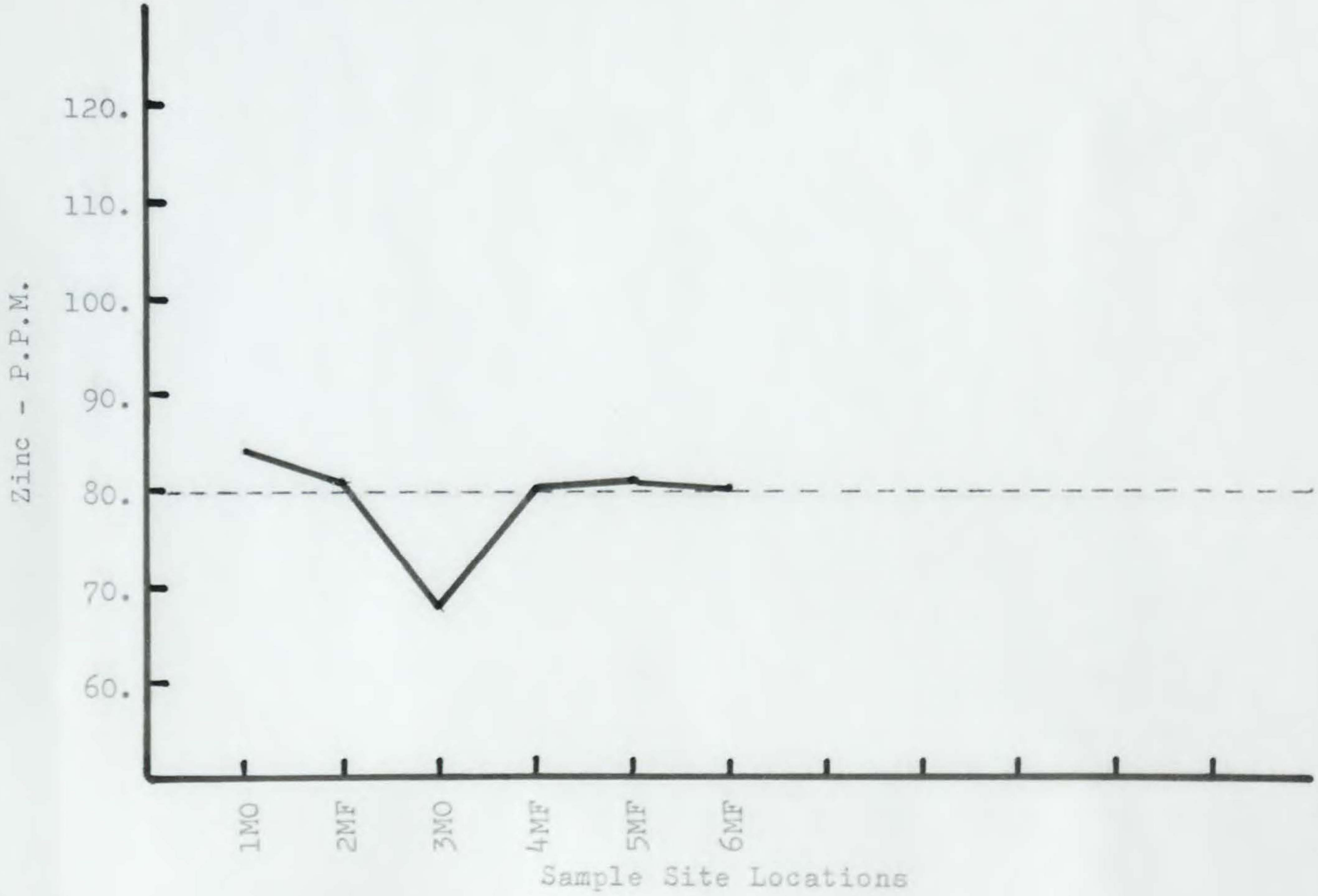

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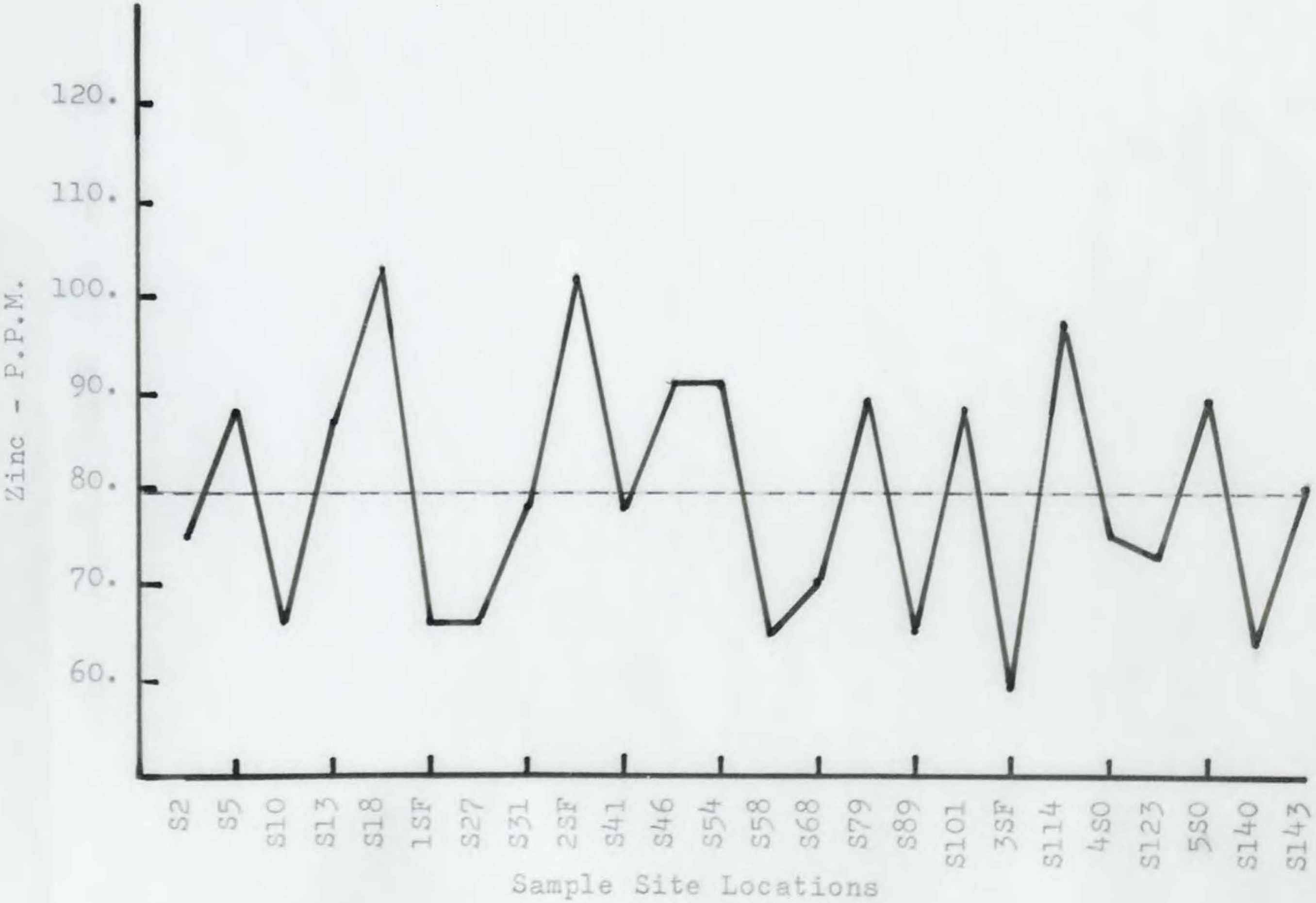

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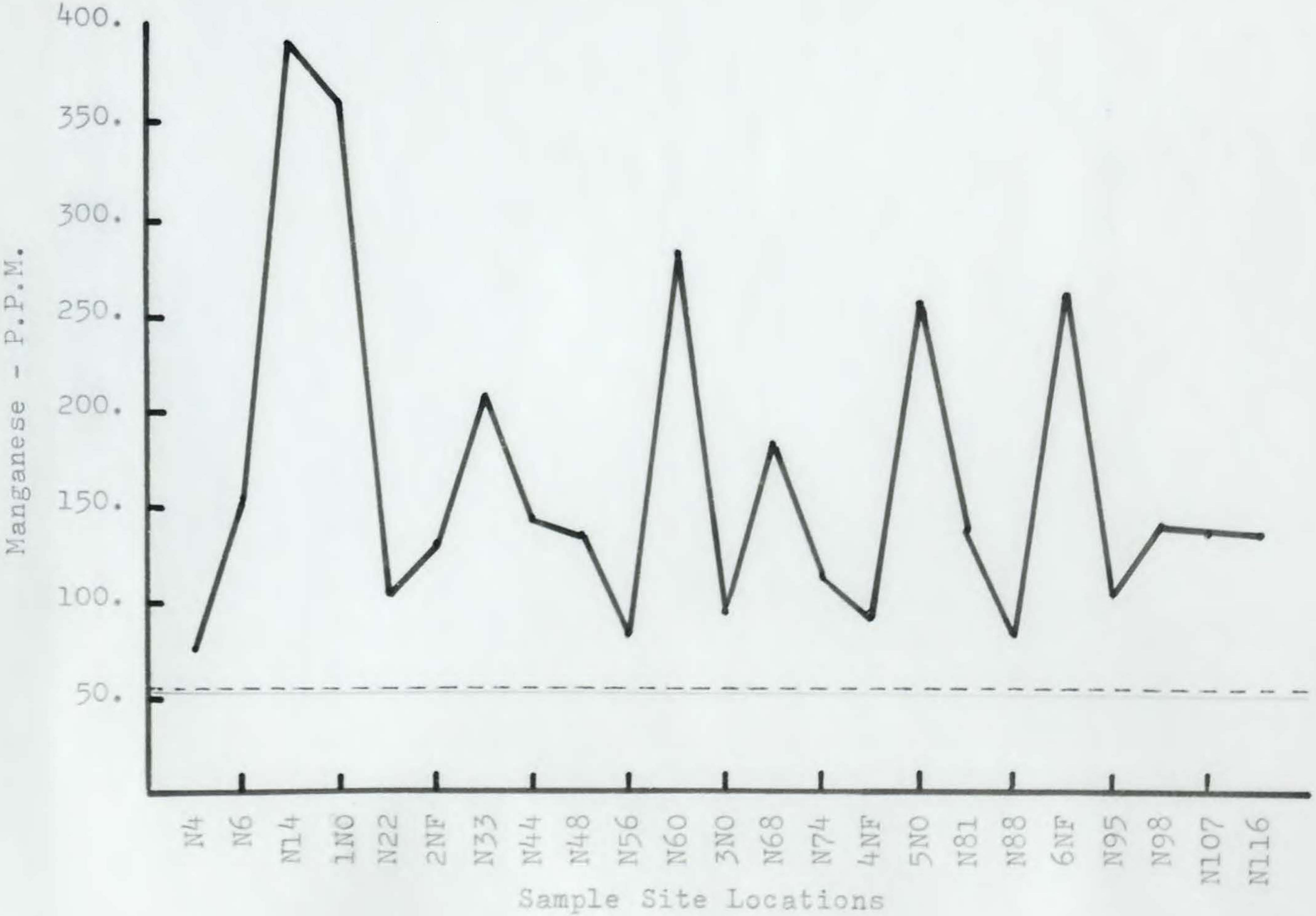
Available Mn in Surface 4" of North Fork Soils



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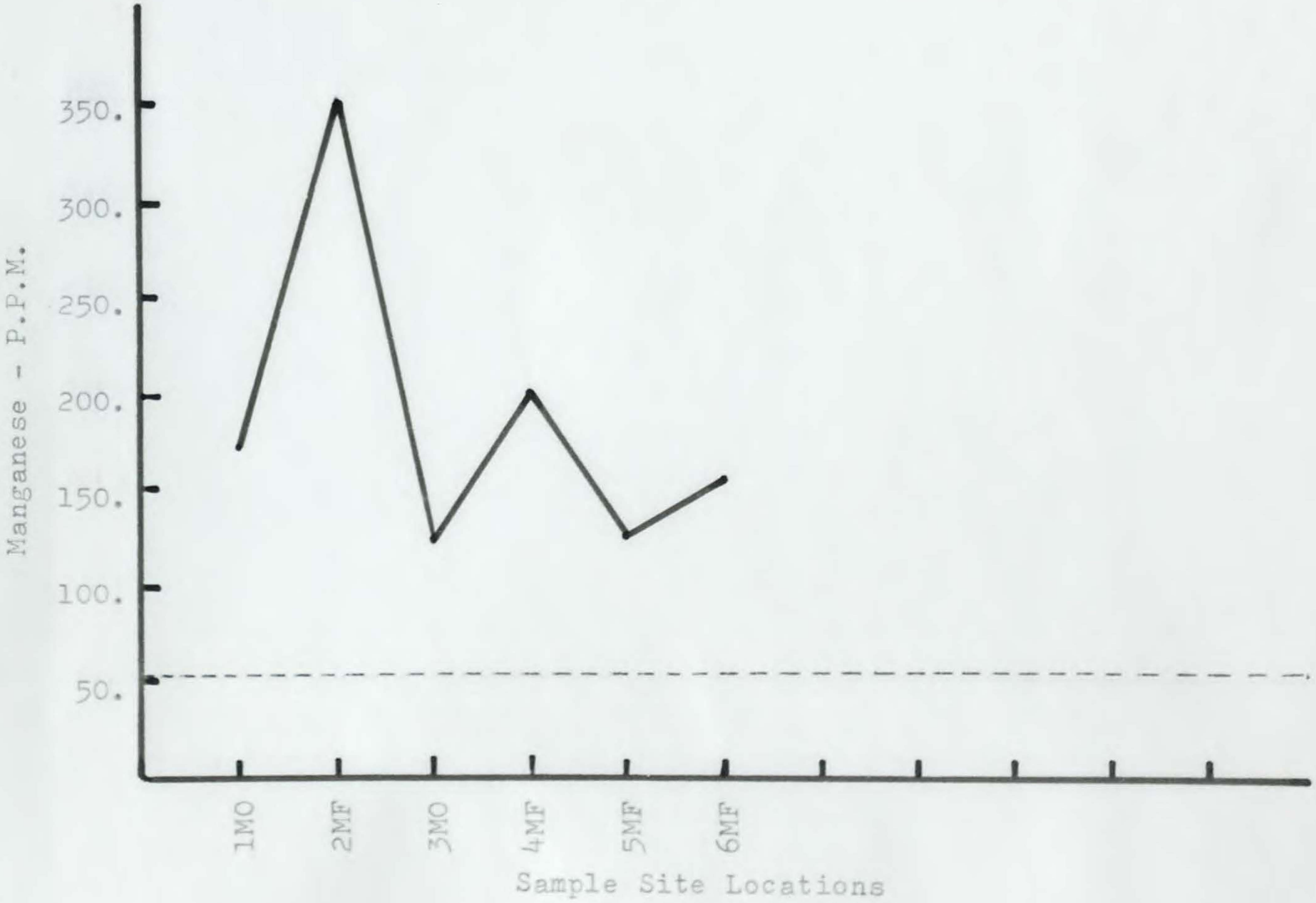

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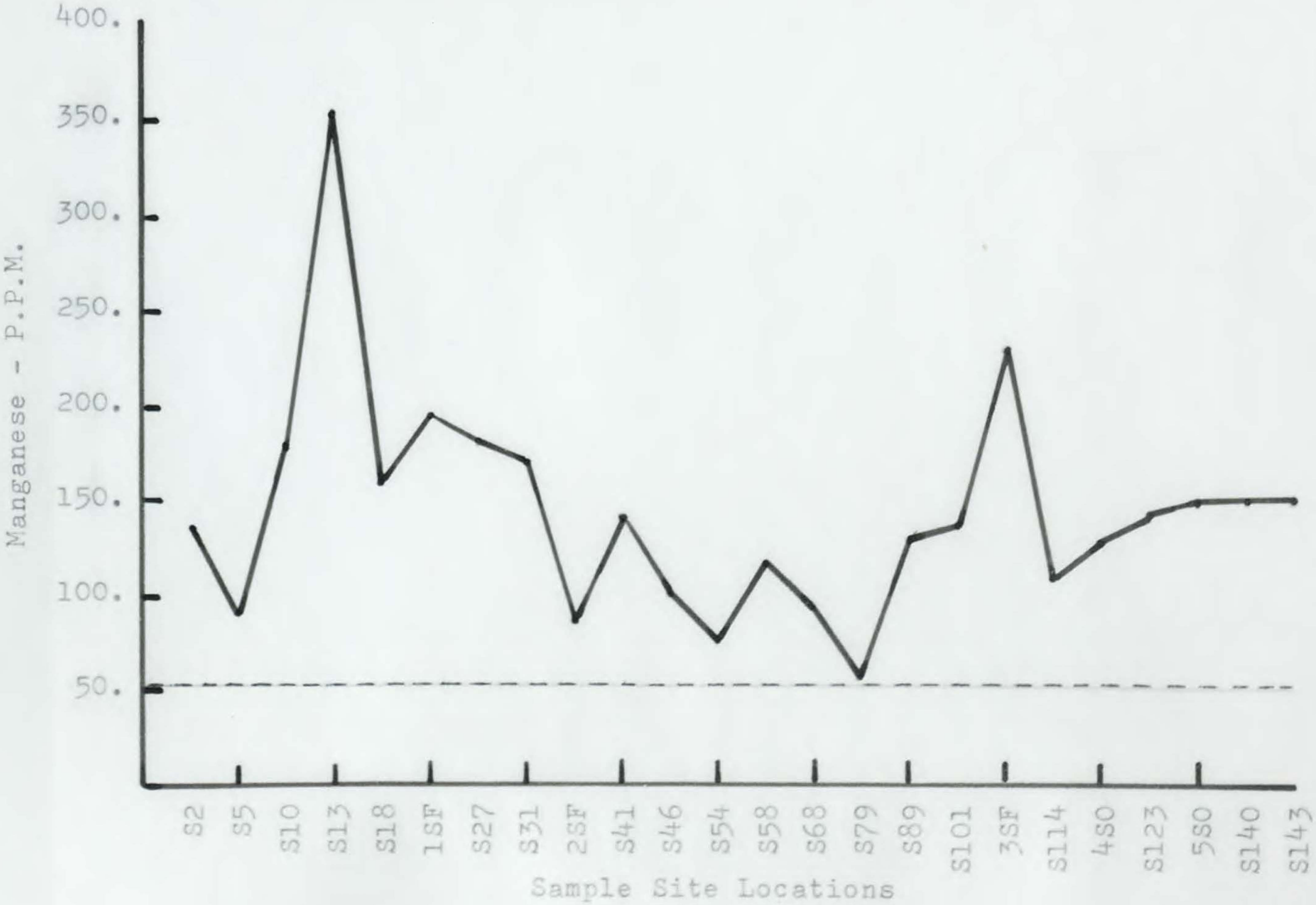

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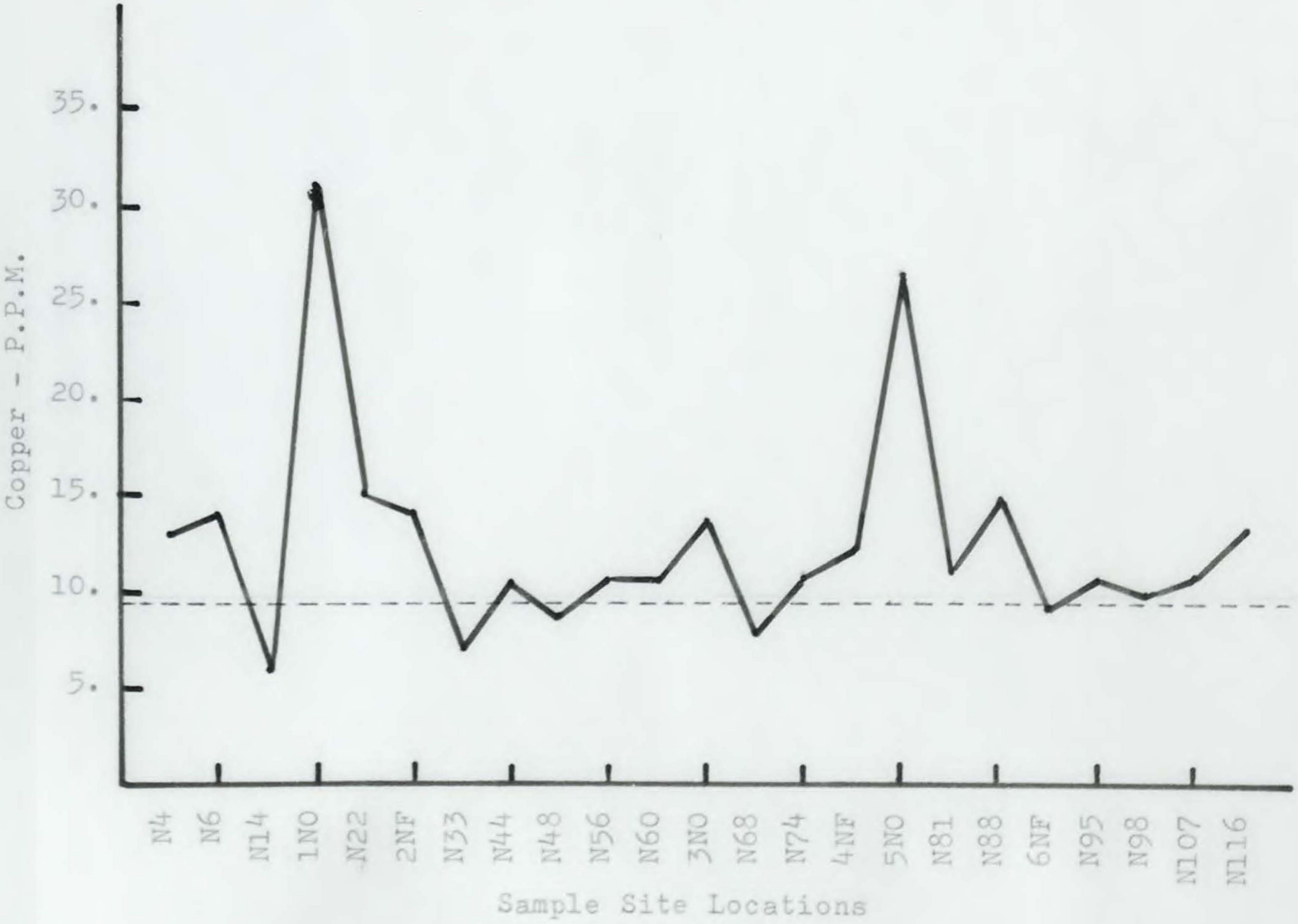

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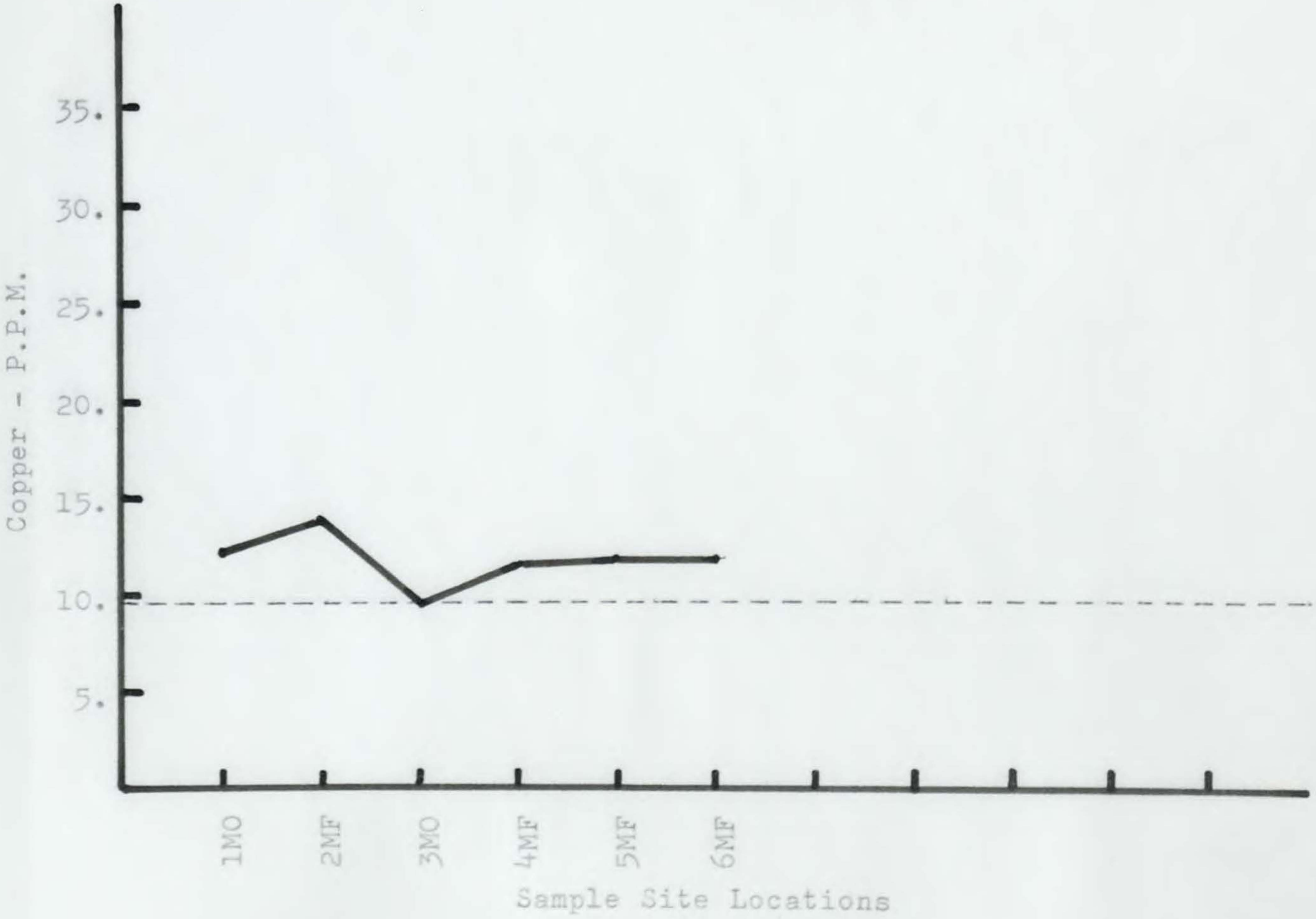

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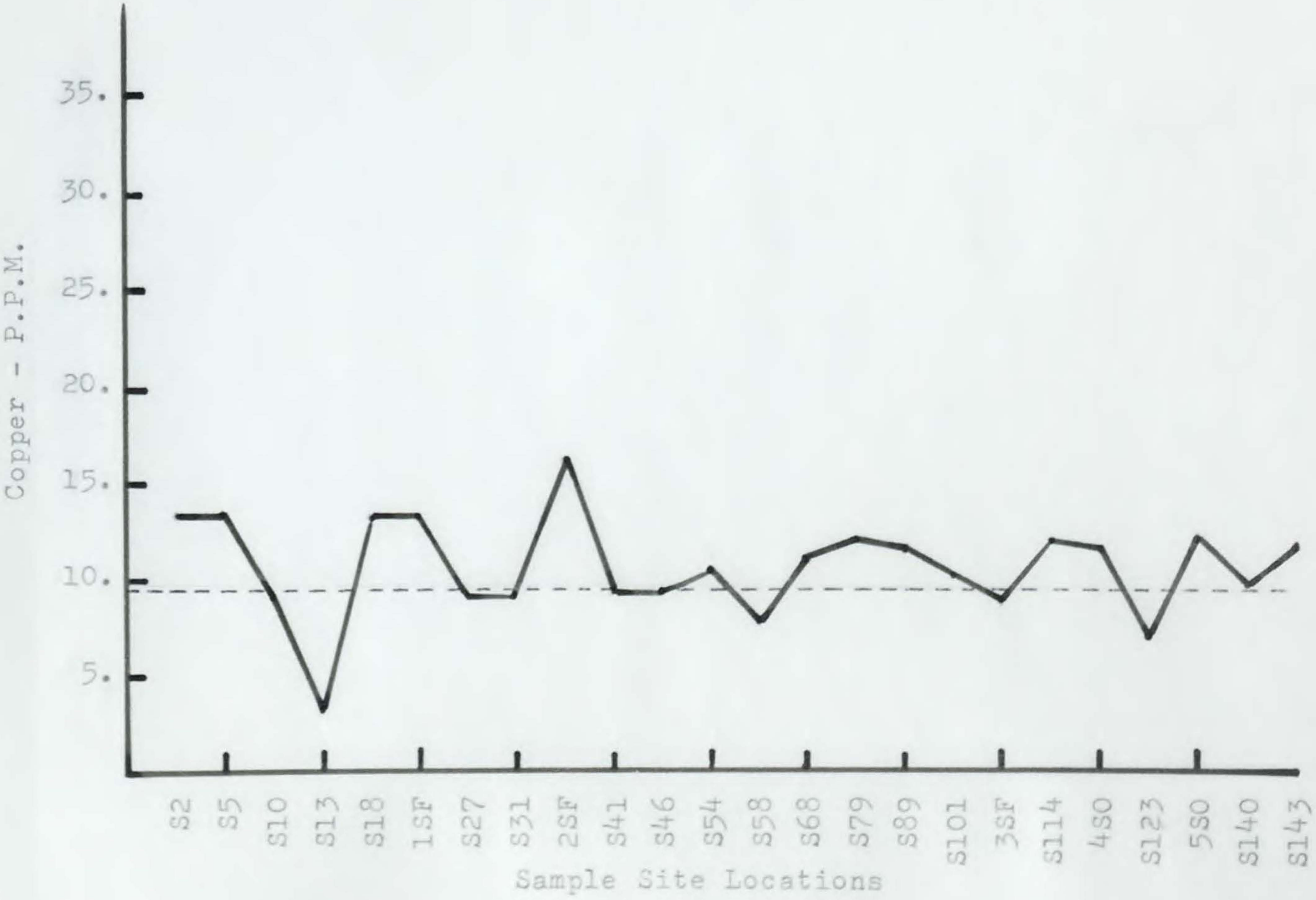
Available Cu in Surface 4" of South Fork Soils



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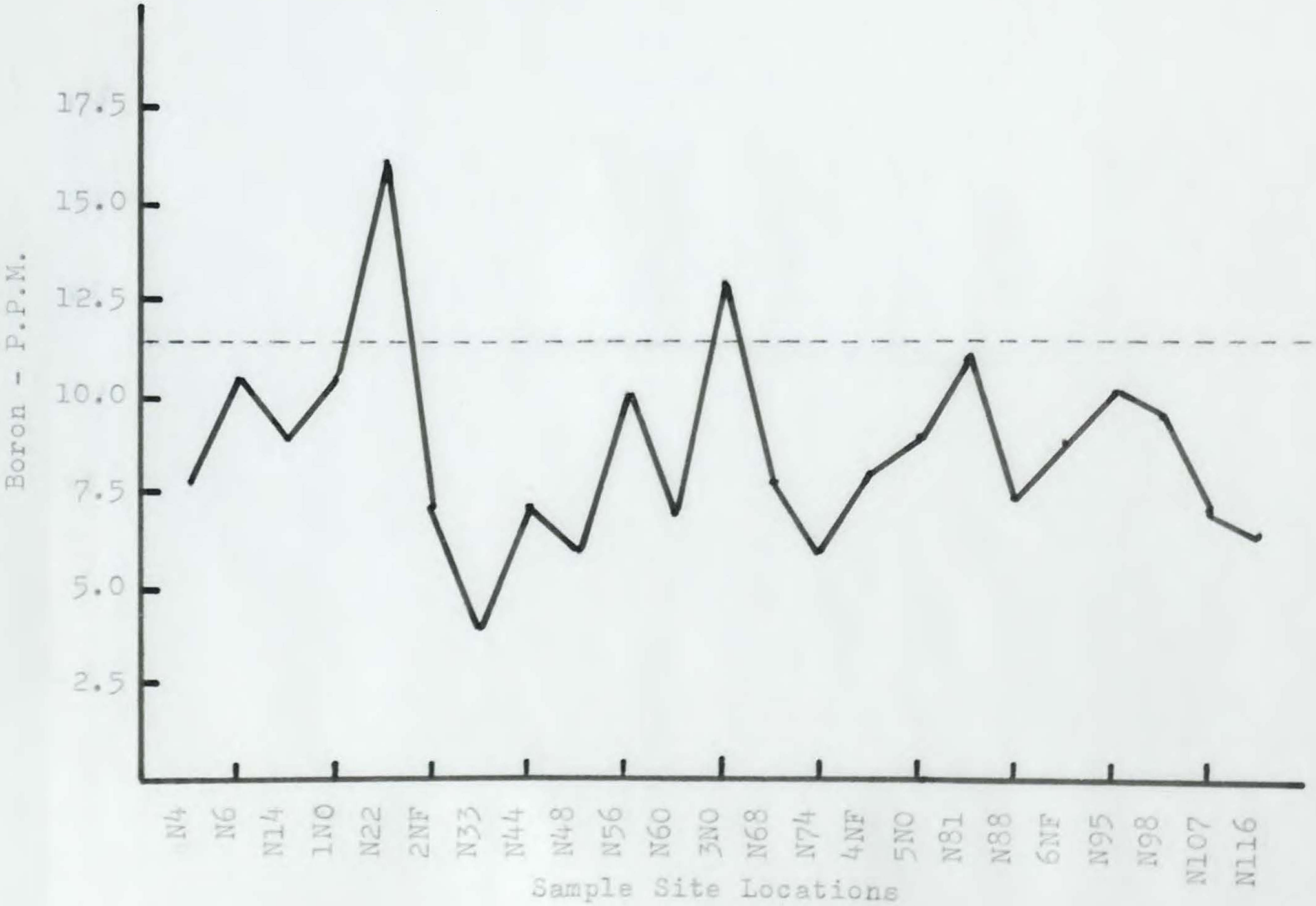
Available B in Surface 4" of North Fork Soils



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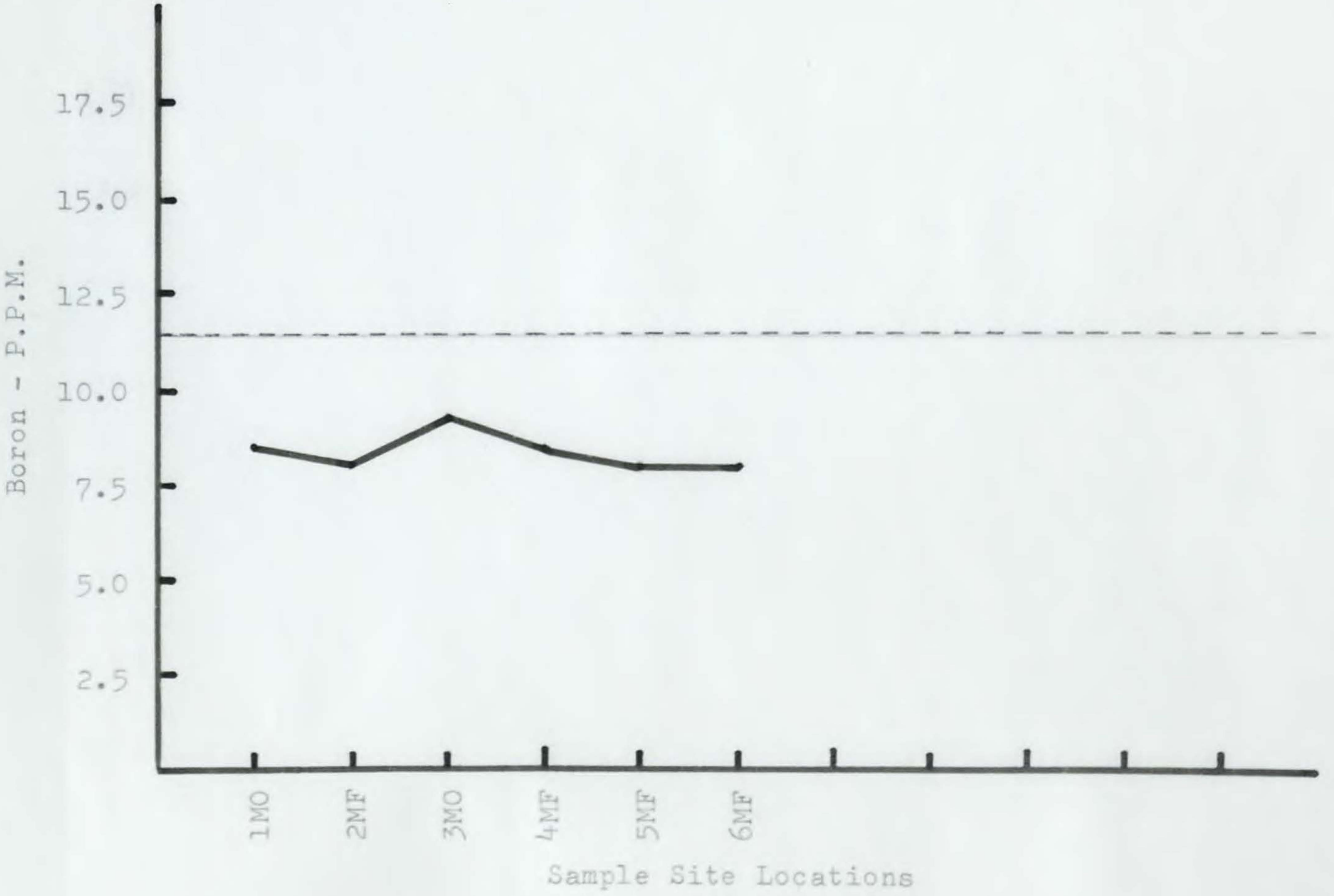

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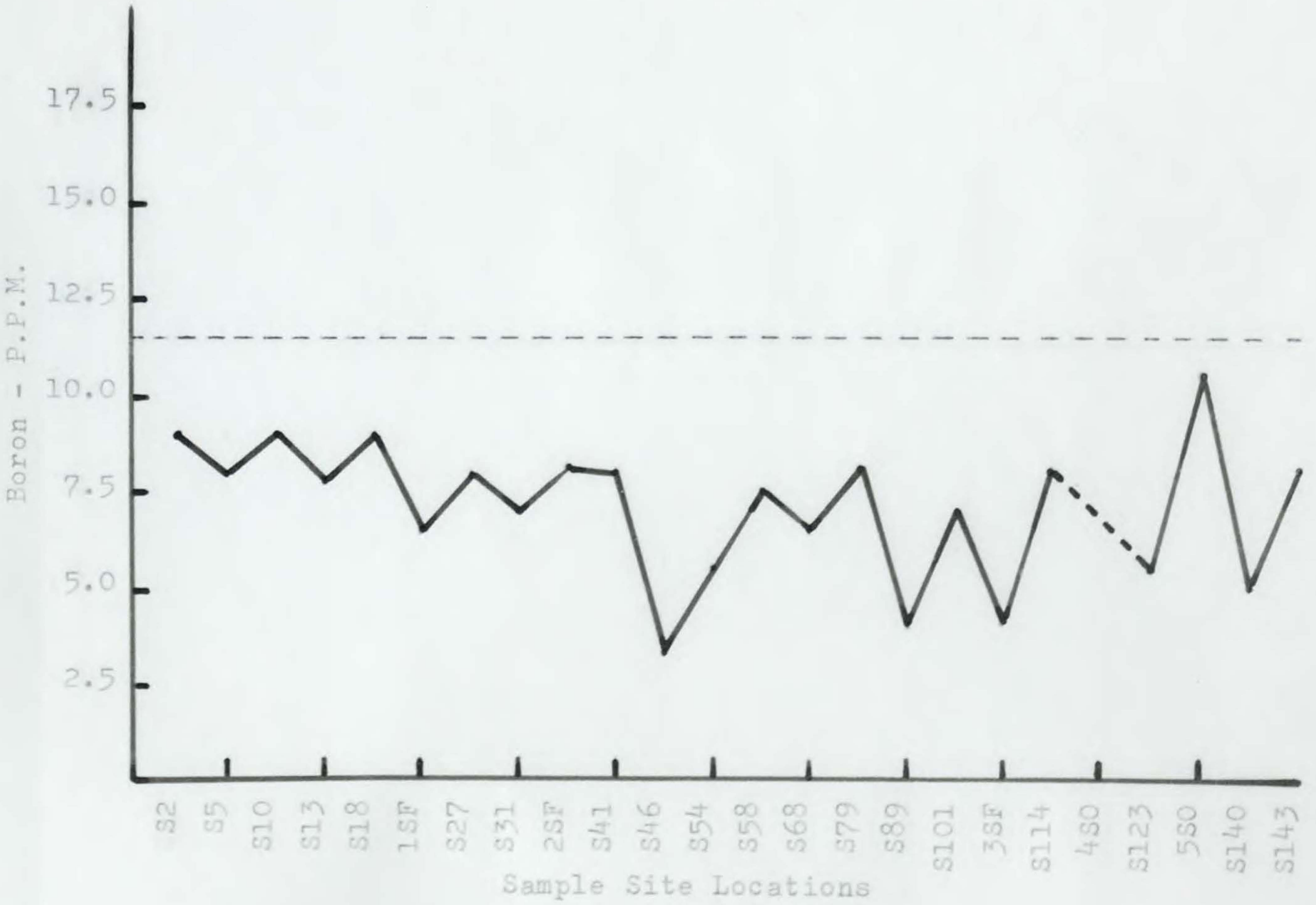

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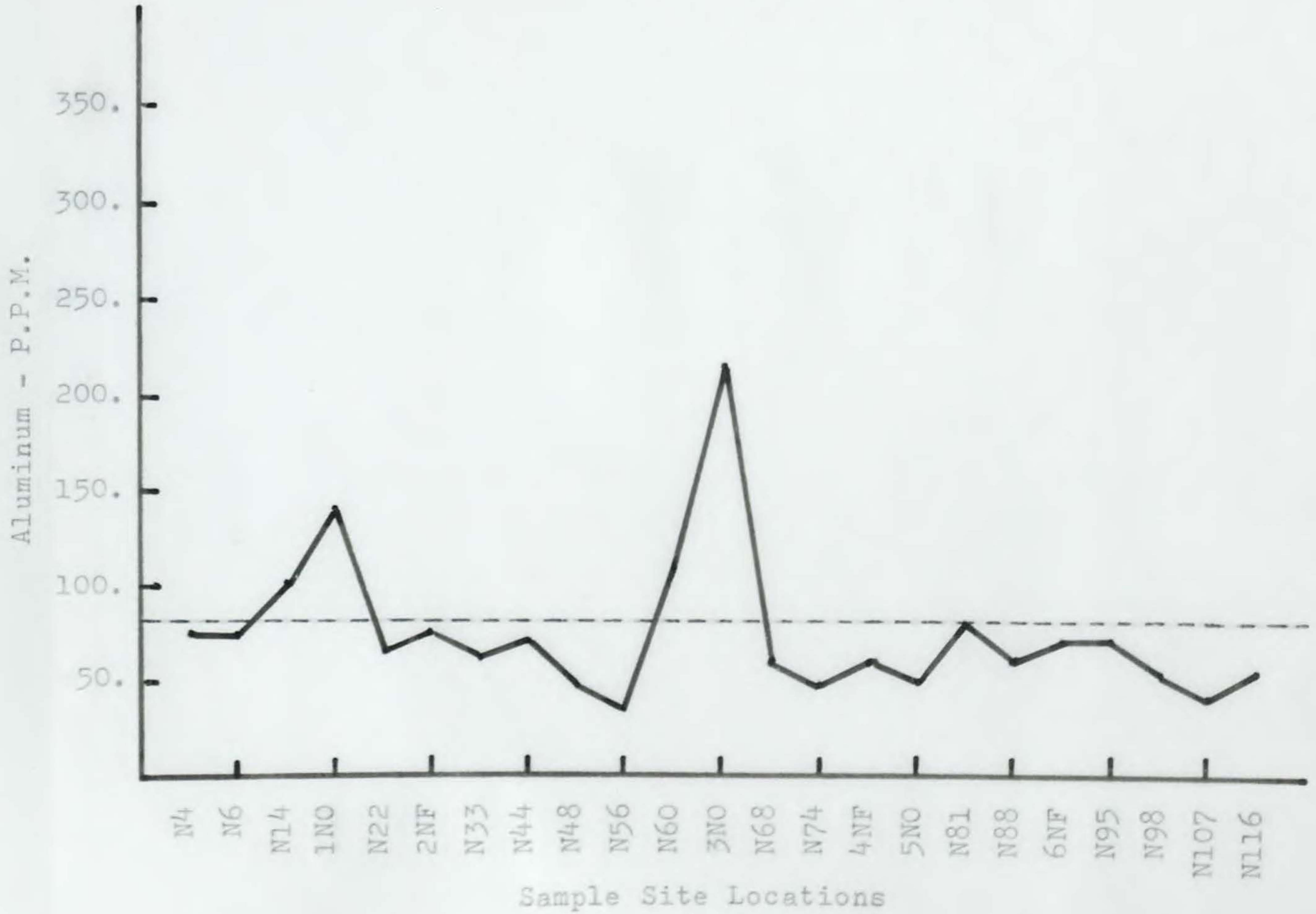

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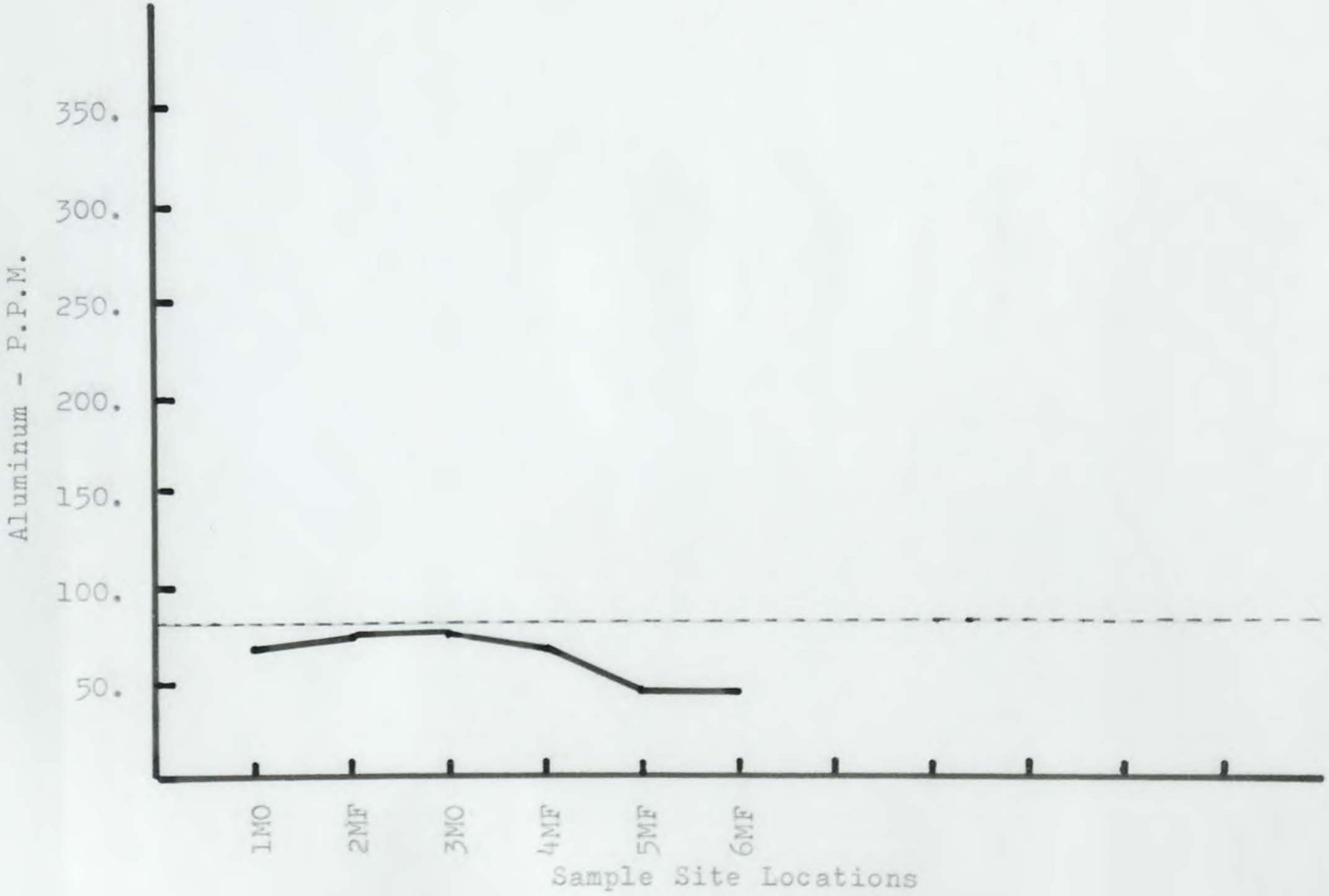

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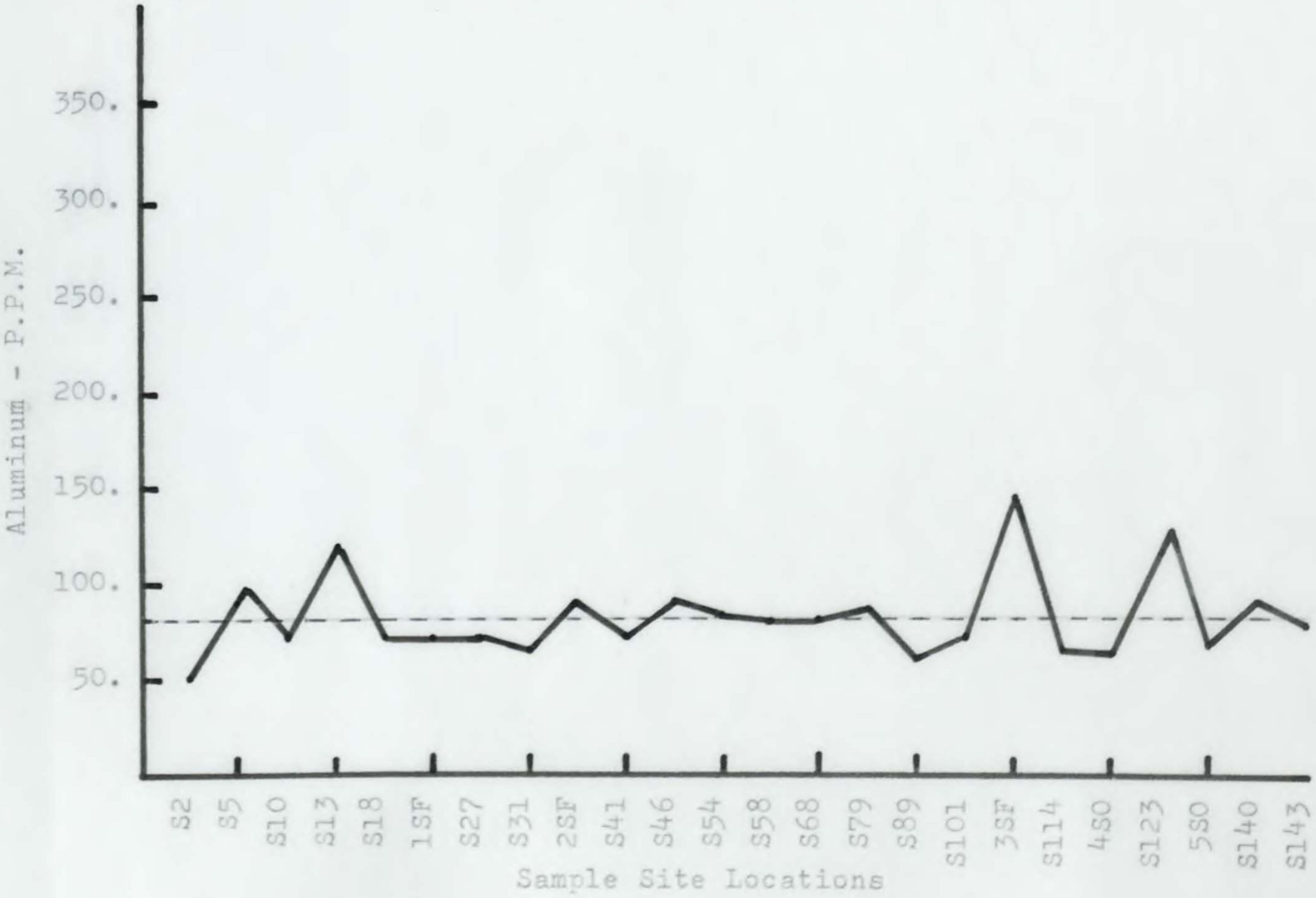

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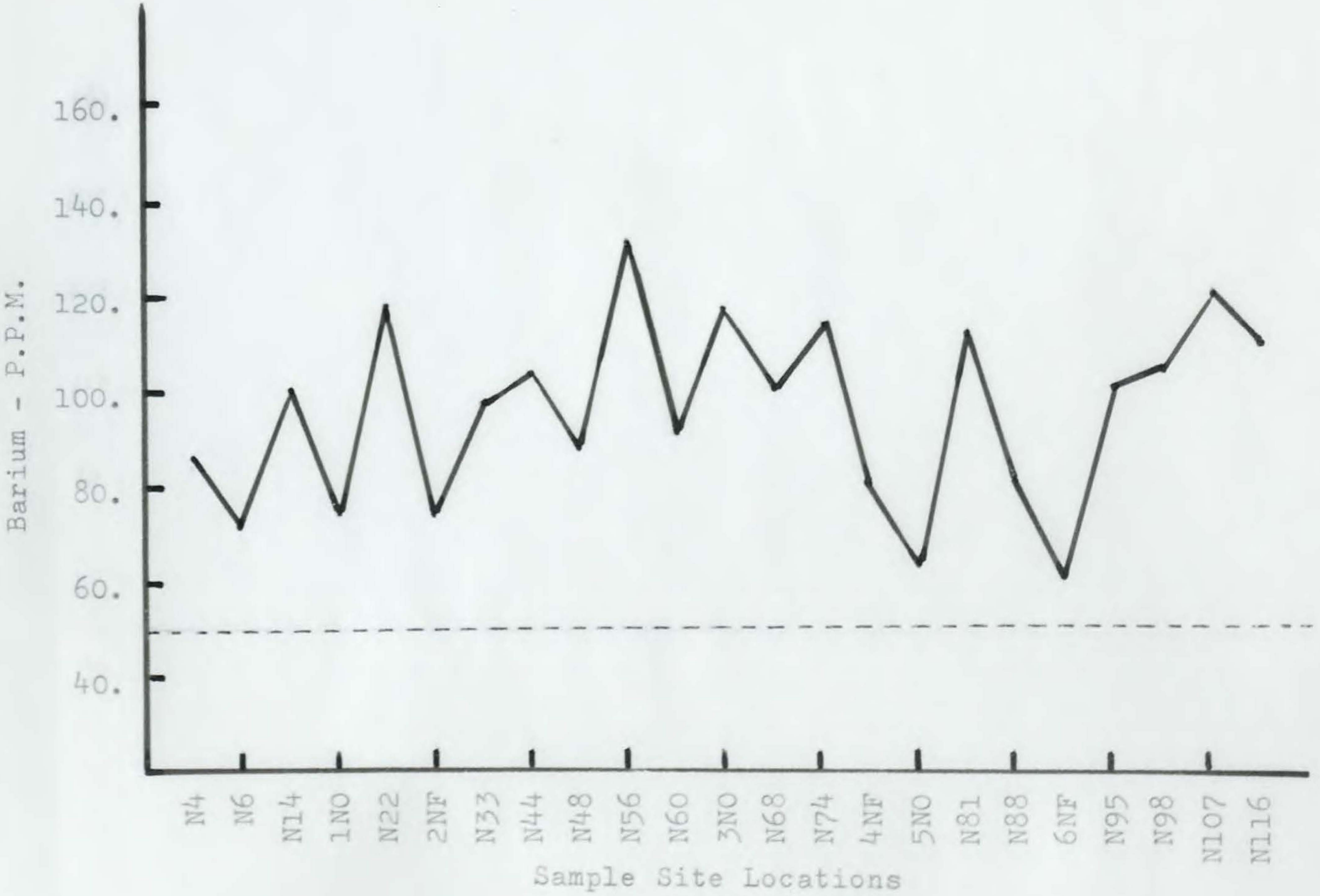

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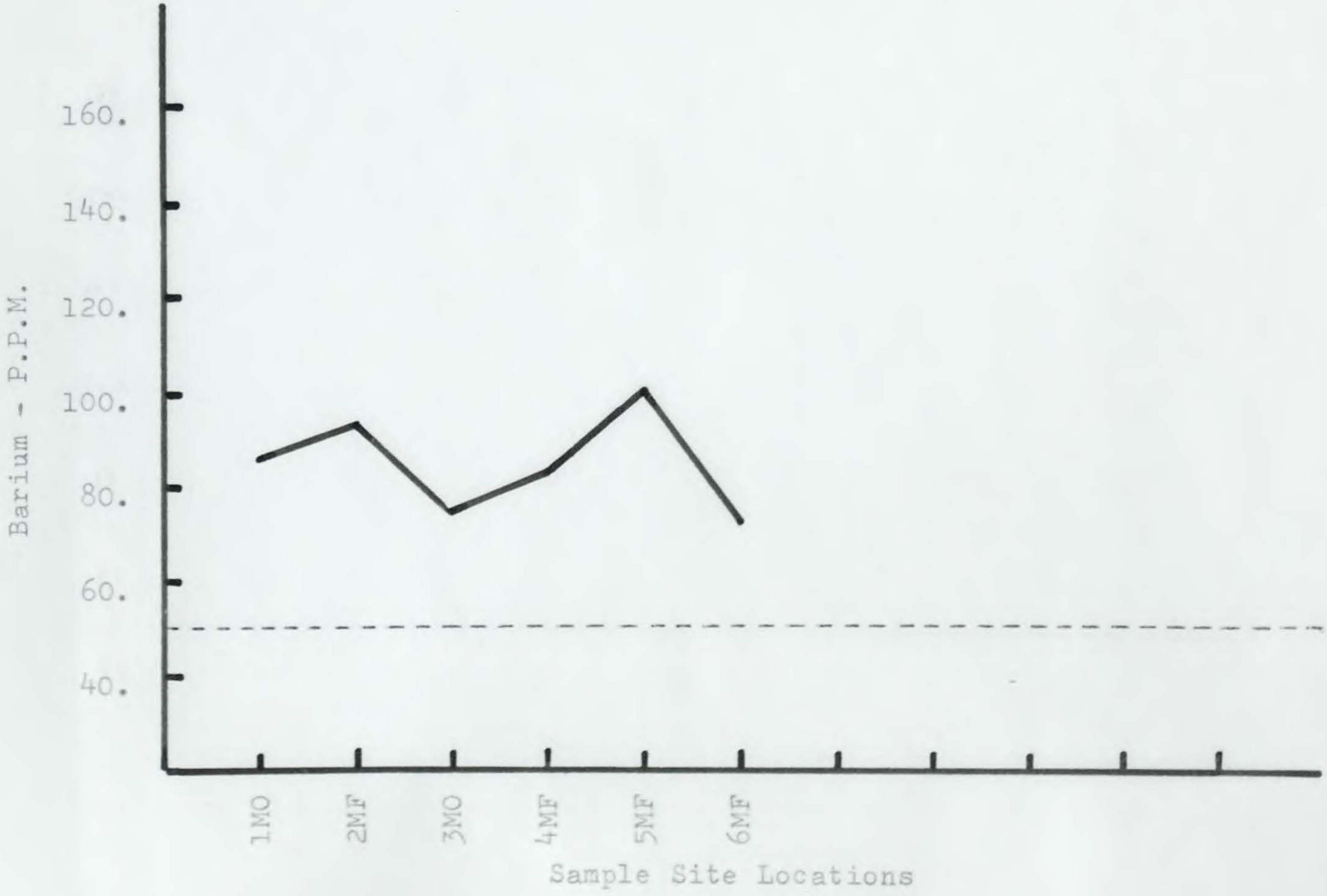
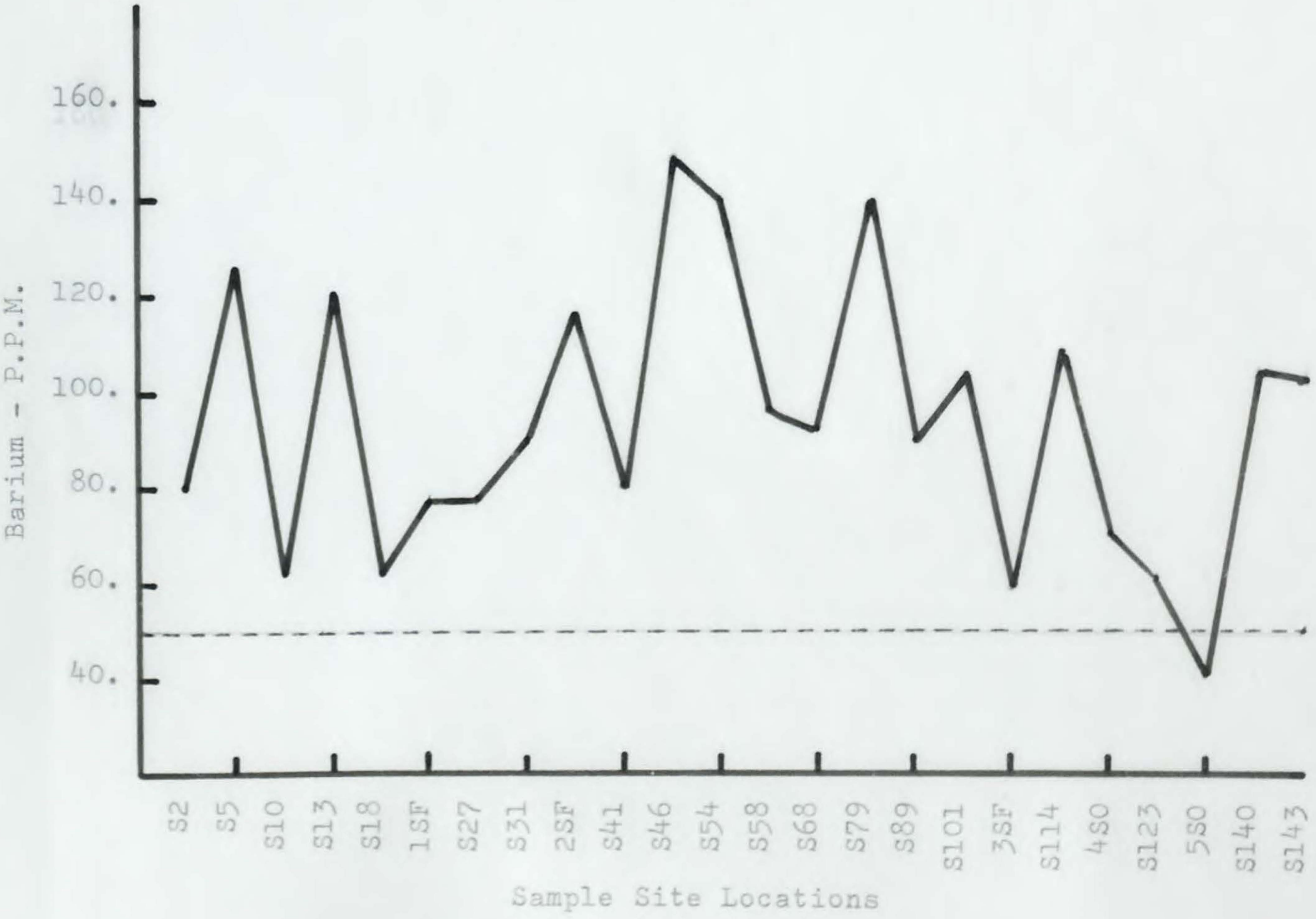


145

NEUBAUER TEST

Available Ba in Surface 4" of South Fork Soils



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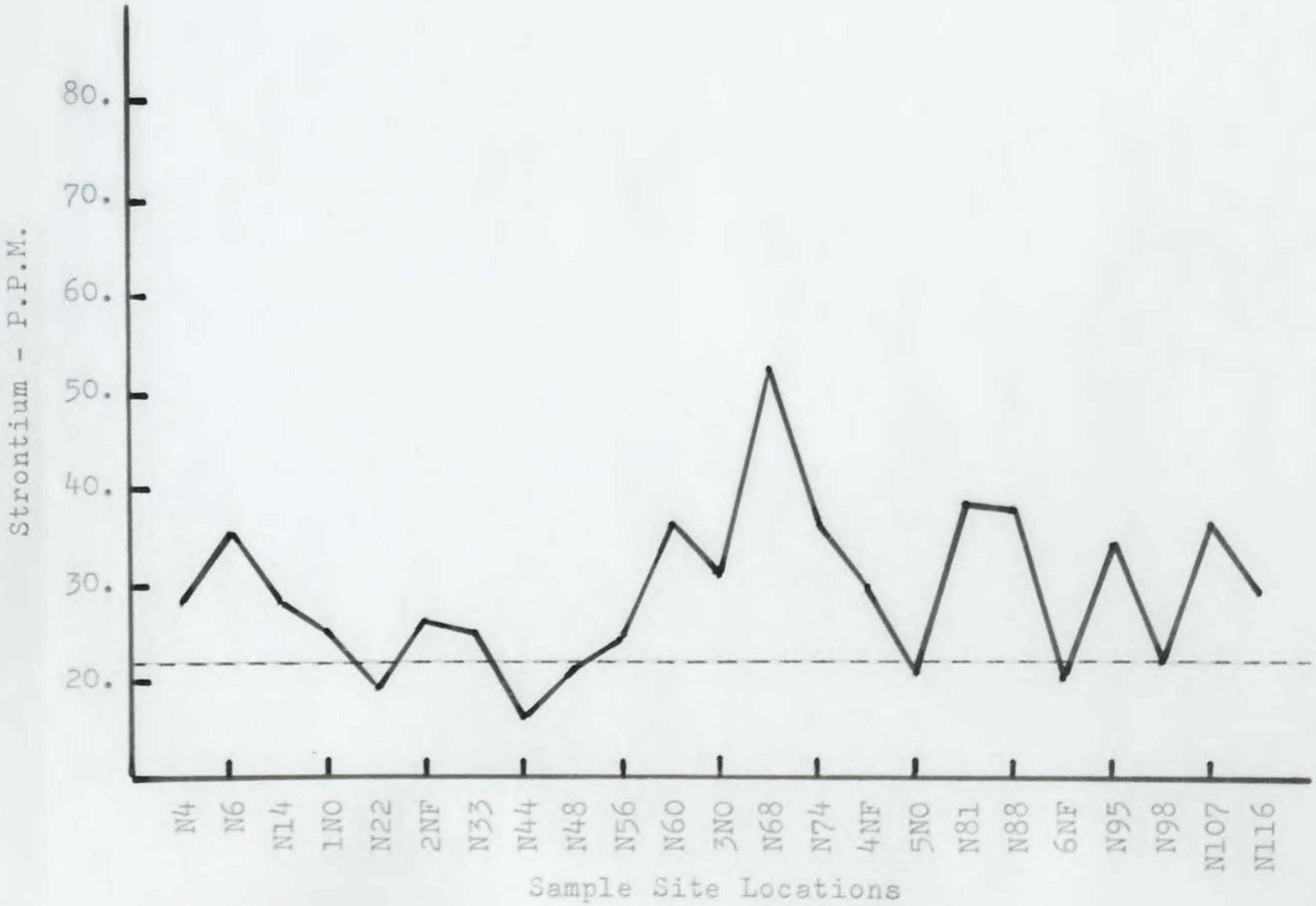

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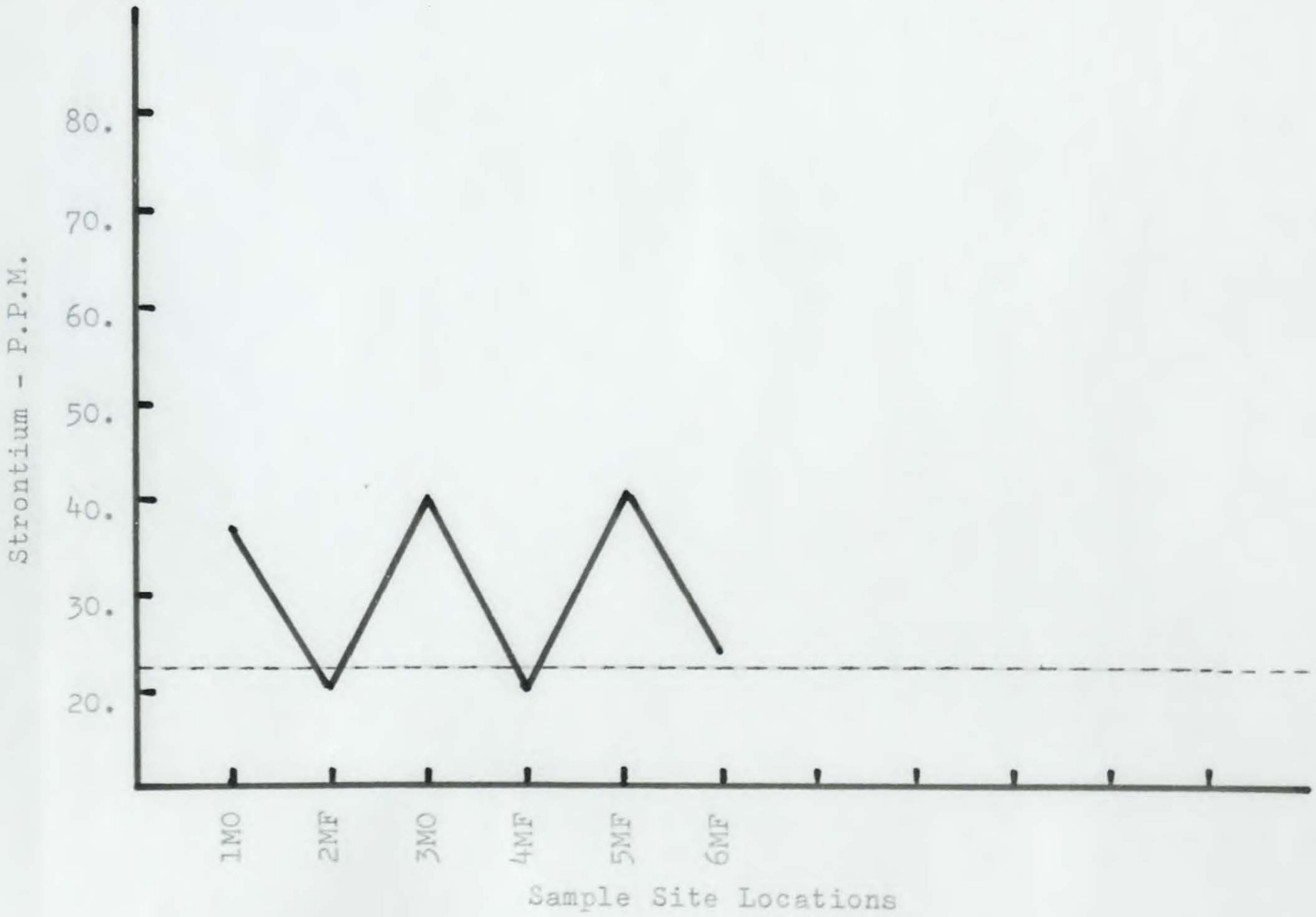
Available Sr in Surface 4" of Middle Fork Soils



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Available Sr in Surface 4" of South Fork Soils

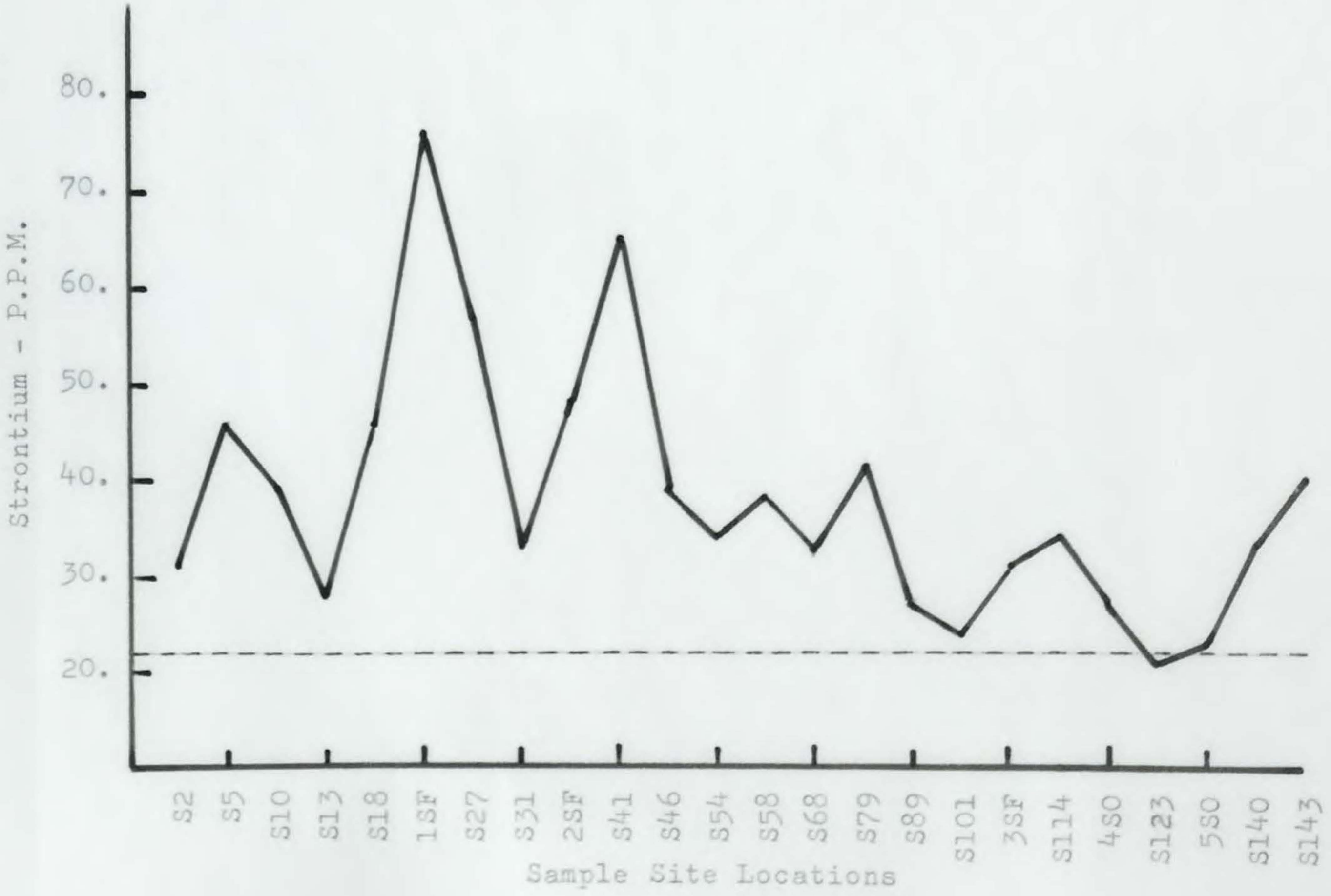


Table 11. Elemental Composition of New Mexico Locust and Bracken Fern at Pit Sample Sites From Samples Collected August 1966.

Site Number	Plant	P %	K %	Ca %	Mg %	Na %	Al ppm	Ba ppm	Fe ppm	Sr ppm	B ppm	Cu ppm	Zn ppm	Mn ppm
1NO	Locust	0.15	1.2	1.80	0.34	0.010	48	72	41	120	20	13.0	16	46
2NF	"	0.16	1.8	1.70	0.26	0.010	60	65	51	132	15	4.6	13	46
3NO	"	0.11	1.1	3.30	0.80	0.039	115	46	57	200	41	8.8	16	50
3NO	"	0.44	2.0	0.78	0.24	0.029	36	13	50	38	58	16.0	28	27
4NF	"	0.16	2.6	1.80	0.18	0.027	87	32	85	132	17	8.3	17	36
5NO	"	0.21	2.0	0.93	0.09	0.010	36	26	65	38	31	8.8	15	31
1NO*	Fern	-	-	-	-	-	-	-	-	-	-	-	-	-
2NF	"	0.11	2.0	0.47	0.24	0.018	77	172	58	75	11	4.1	12	70
3NO*	"	-	-	-	-	-	-	-	-	-	-	-	-	-
4NF	"	0.21	2.6	0.55	0.28	0.029	73	121	51	164	17	4.6	17	40
5NO	"	0.11	2.0	0.34	0.16	0.022	101	49	72	26	13	4.6	12	80
6NF	"	0.21	2.4	0.61	0.17	0.010	48	150	45	56	13	4.6	17	126
1MO*	Locust	-	-	-	-	-	-	-	-	-	-	-	-	-
2MF	"	0.16	1.7	1.60	0.22	0.010	48	76	51	96	17	6.6	25	60
3MO	"	0.16	1.2	1.60	0.30	0.018	70	13	51	80	28	8.3	12	18
4MF	"	0.29	2.0	2.00	0.39	0.022	130	40	115	138	26	6.6	16	50
5MF	"	0.21	3.20	0.85	0.11	0.010	45	15	65	65	20	6.6	11	21
6MF	"	0.11	2.20	1.80	0.26	0.010	60	32	65	114	22	4.6	10	50
1MO*	Fern	-	-	-	-	-	-	-	-	-	-	-	-	-
2MF*	"	-	-	-	-	-	-	-	-	-	-	-	-	-
3MO	"	0.21	2.20	0.44	0.26	0.022	285	240	150	200	11	4.6	12	14
4MF	"	0.11	2.00	0.44	0.26	0.010	48	153	51	75	9	3.7	12	90
5MF	"	0.14	2.40	0.47	0.24	0.022	48	180	57	144	12	6.6	13	50
6MF	"	0.25	3.50	0.34	0.18	0.010	45	112	36	65	10	4.6	10	41

* Plant not found at this site.

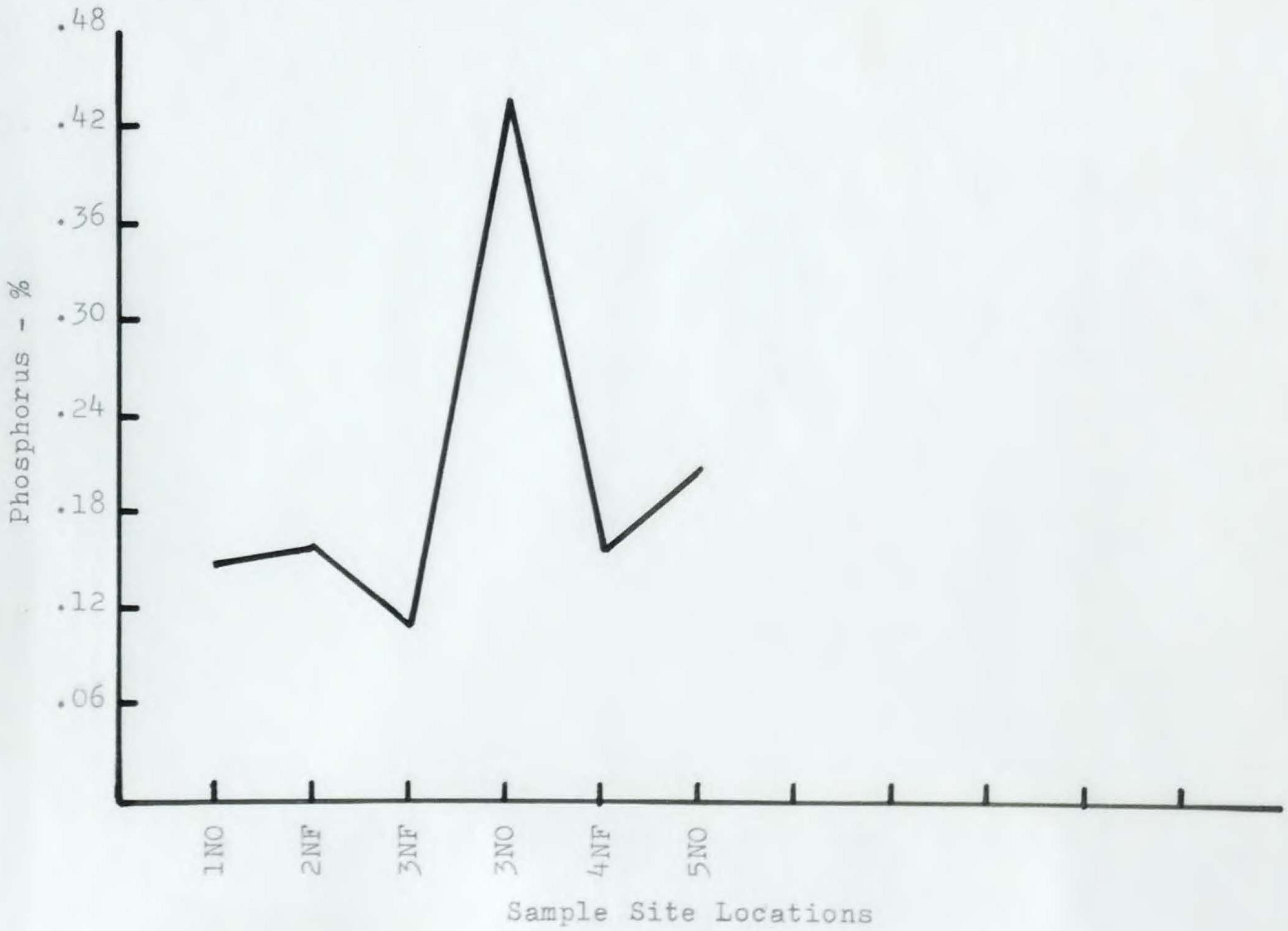
Table 11. Elemental Composition of New Mexico Locust and Bracken Fern at Pit Sample Sites From Samples Collected August 1966.

Site Number	Plant	P %	K %	Ca %	Mg %	Na %	Al ppm	Ba ppm	Fe ppm	Sr ppm	B ppm	Cu ppm	Zn ppm	Mn ppm
1SF	Locust	0.21	2.0	1.70	0.20	0.010	48	7	51	108	22	4.6	12	26
2SF	"	0.16	2.6	1.10	0.26	0.010	36	9	51	35	31	8.3	21	27
3SF	"	0.14	2.0	2.10	0.30	0.029	195	49	135	171	26	6.6	17	50
4SO	"	0.25	2.0	1.20	0.32	0.010	36	13	65	75	28	6.6	15	31
5SO	"	0.21	1.4	1.80	0.26	0.010	130	17	95	126	36	8.8	20	14
1SF*	Fern	-	-	-	-	-	-	-	-	-	-	-	-	-
2SF*	"	-	-	-	-	-	-	-	-	-	-	-	-	-
3SF	"	0.11	1.8	0.34	0.23	0.010	350	59	150	90	11	2.8	8	63
4SO	"	0.21	1.1	0.31	0.43	0.019	255	54	100	200	10	1.0	7	18
5SO	"	0.40	0.8	0.47	0.41	0.018	190	91	95	191	11	1.0	7	30

* Plant not found at this site.

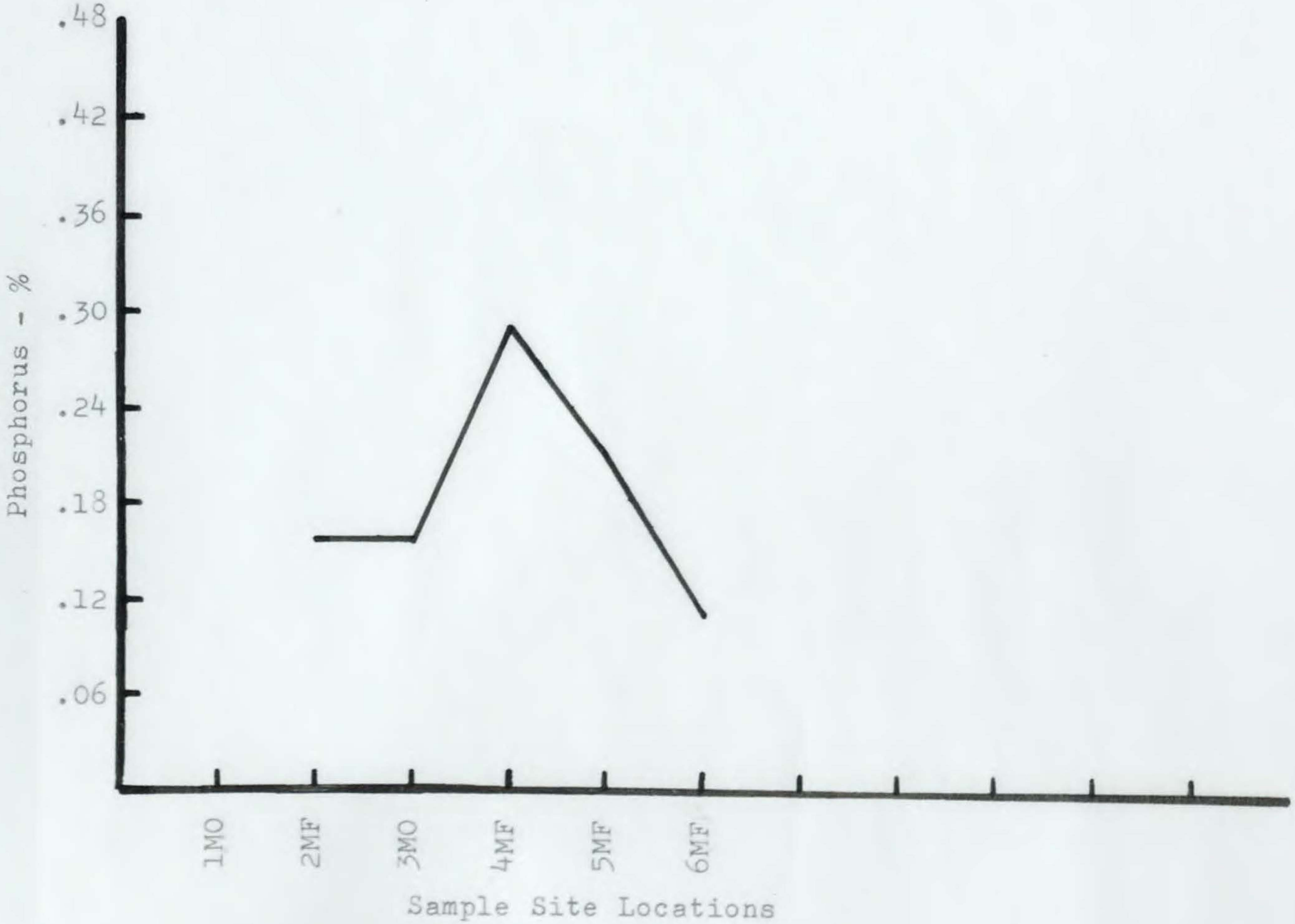
CONCENTRATION OF PHOSPHORUS IN NEW MEXICAN LOCUST

North Fork, Workman Creek



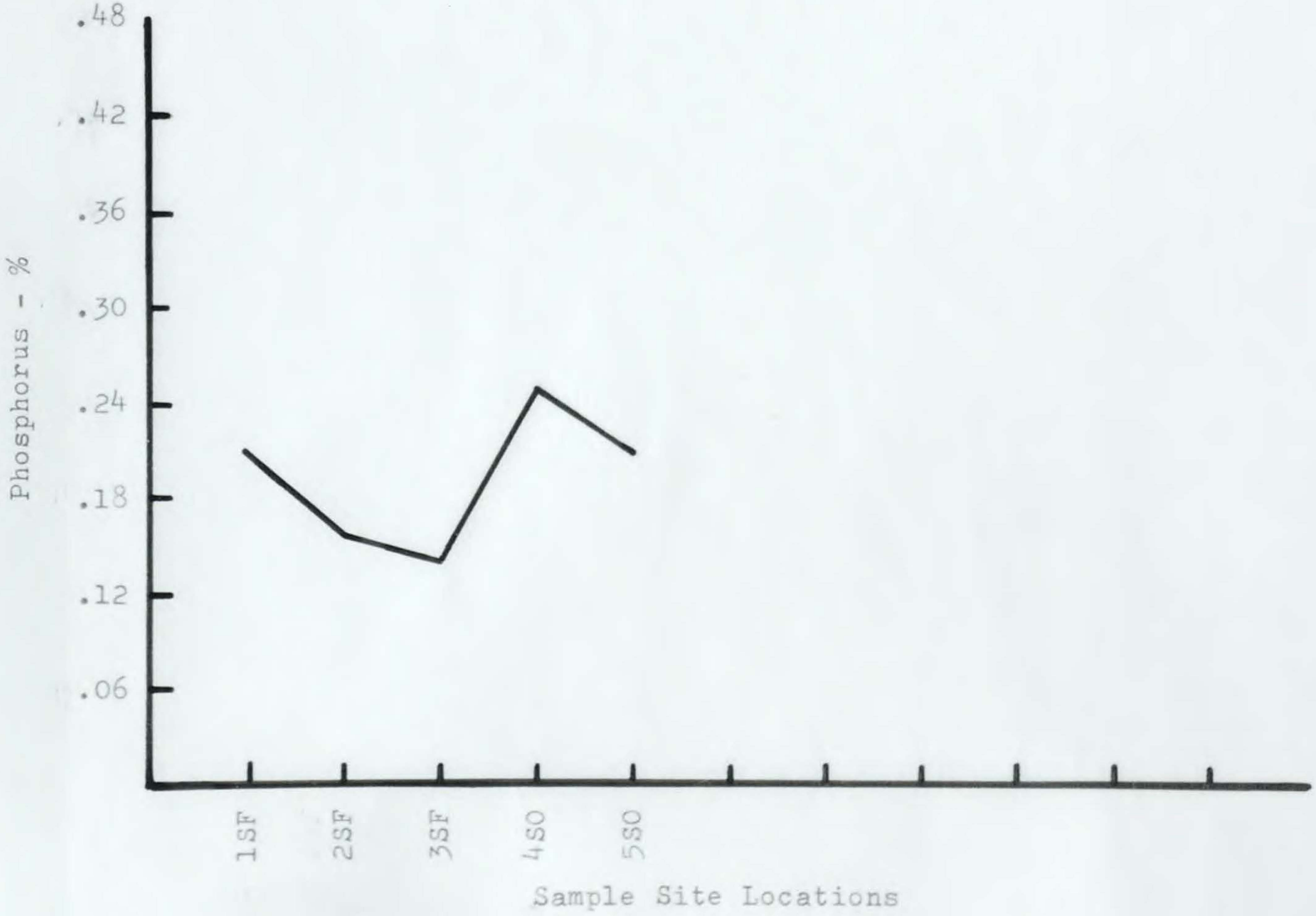
CONCENTRATION OF PHOSPHORUS IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



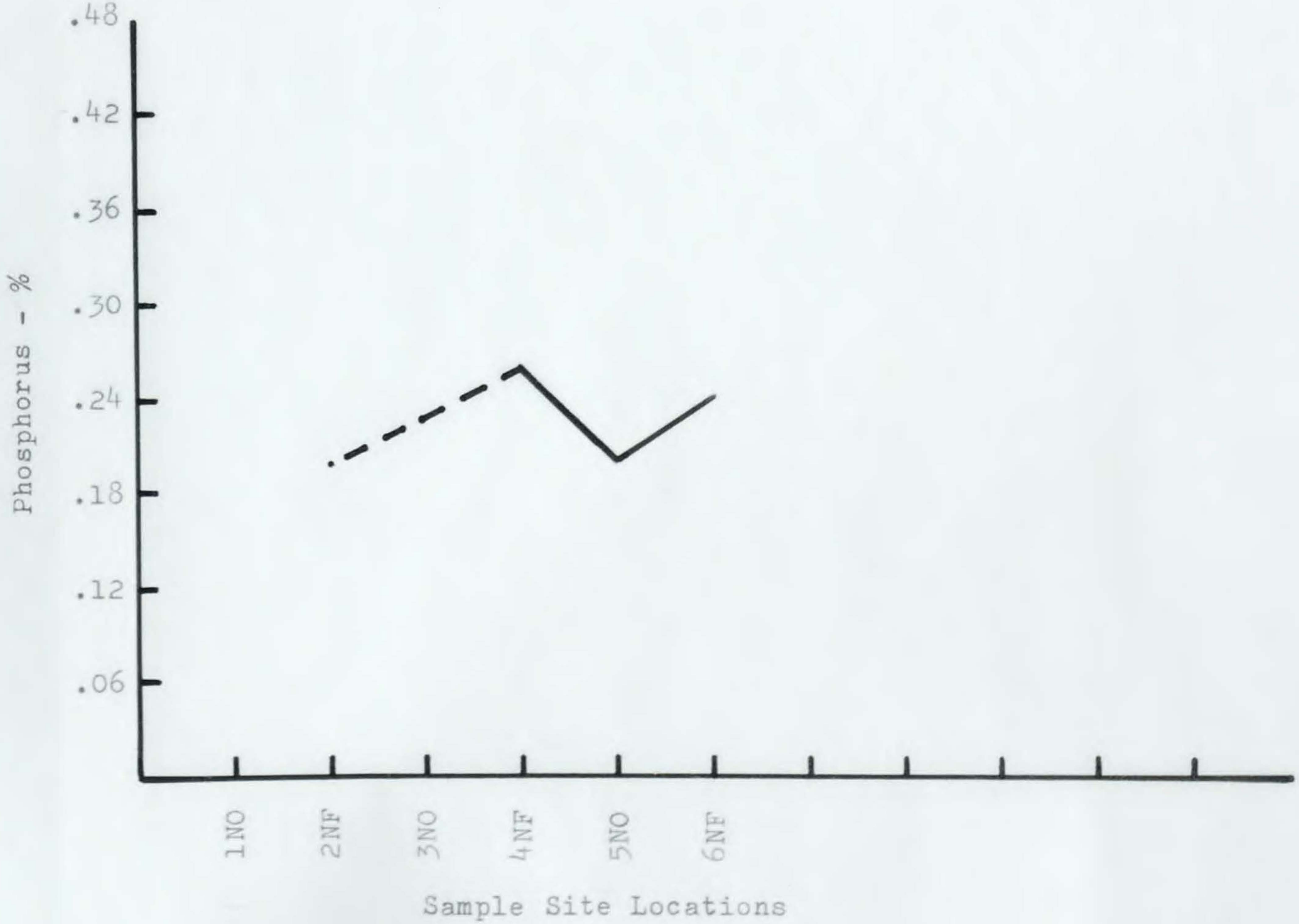
CONCENTRATION OF PHOSPHORUS IN NEW MEXICAN LOCUST

South Fork, Workman Creek



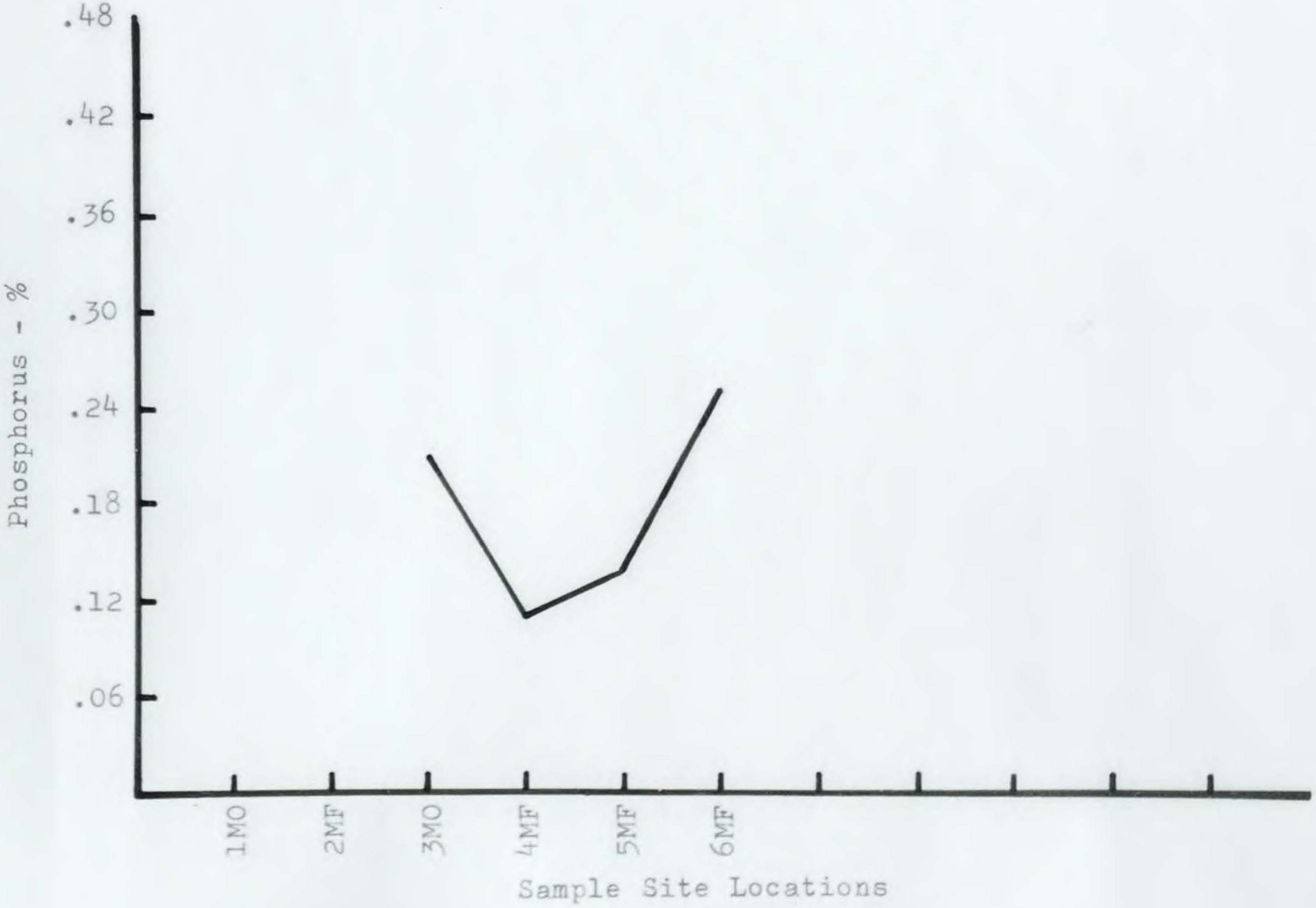
CONCENTRATION OF PHOSPHORUS IN BRACKEN FERN

North Fork, Workman Creek



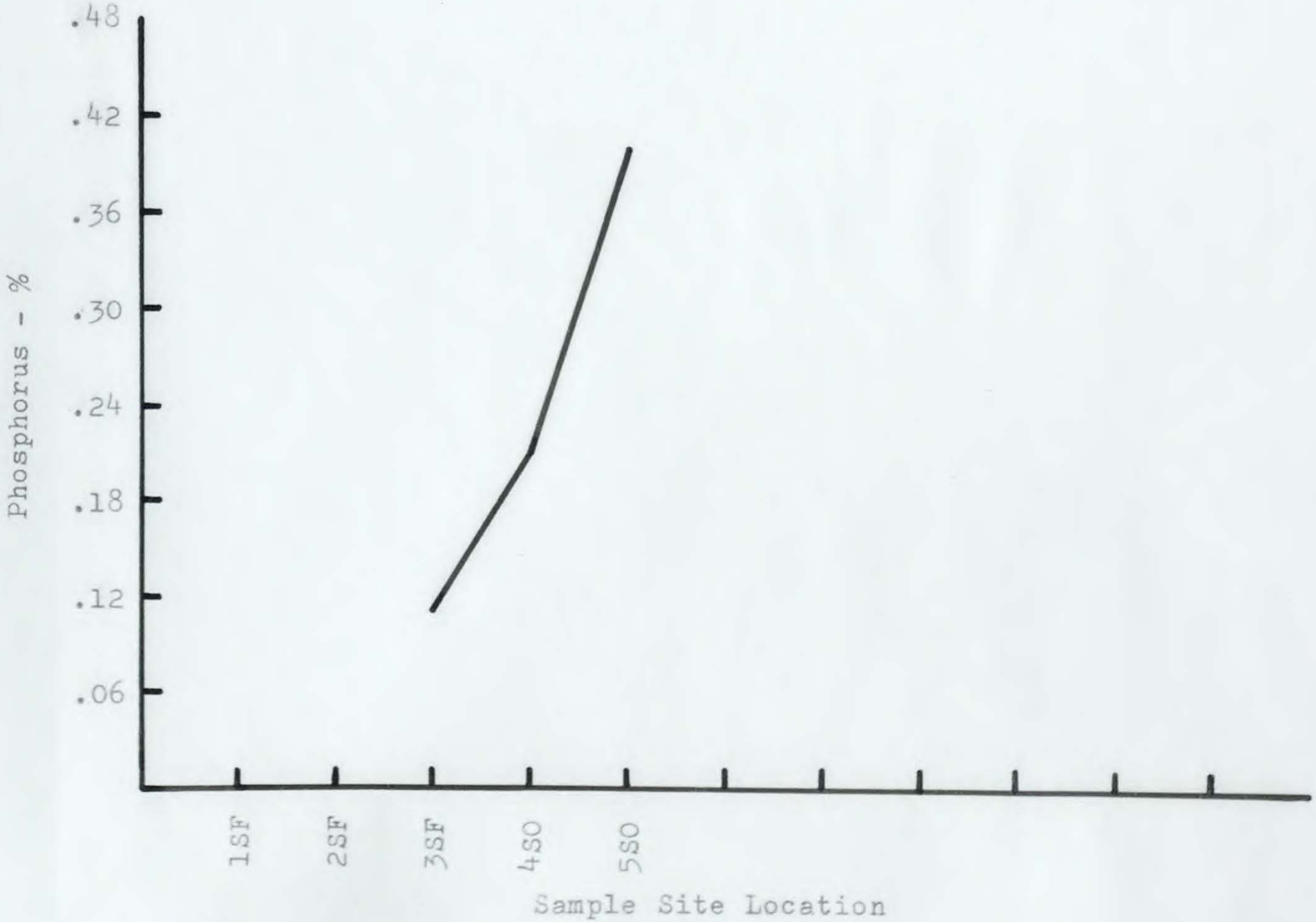
CONCENTRATION OF PHOSPHORUS IN BRACKEN FERN

Middle Fork, Workman Creek



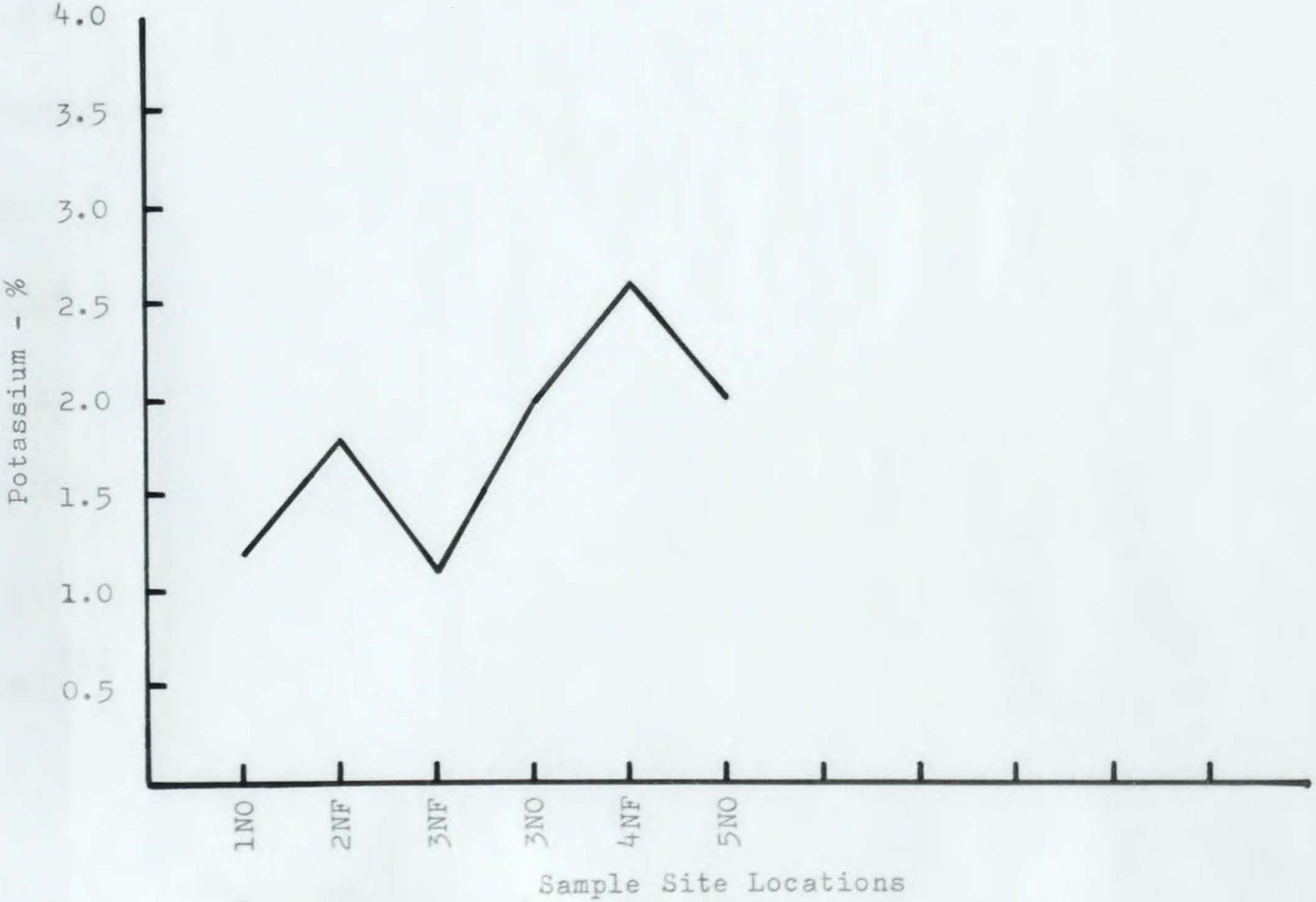
CONCENTRATION OF PHOSPHORUS IN BRACKEN FERN

South Fork, Workman Creek



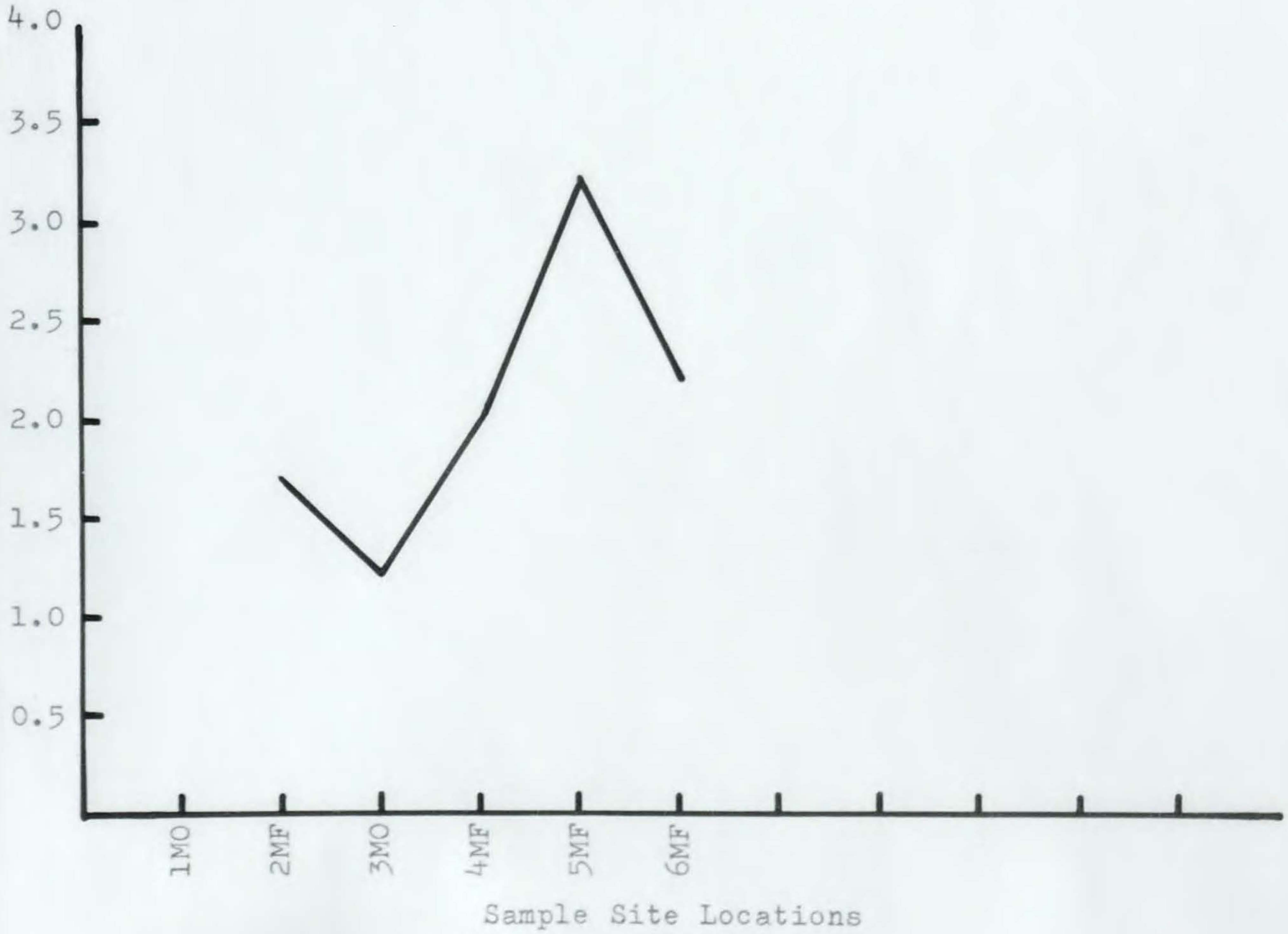
CONCENTRATION OF POTASSIUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



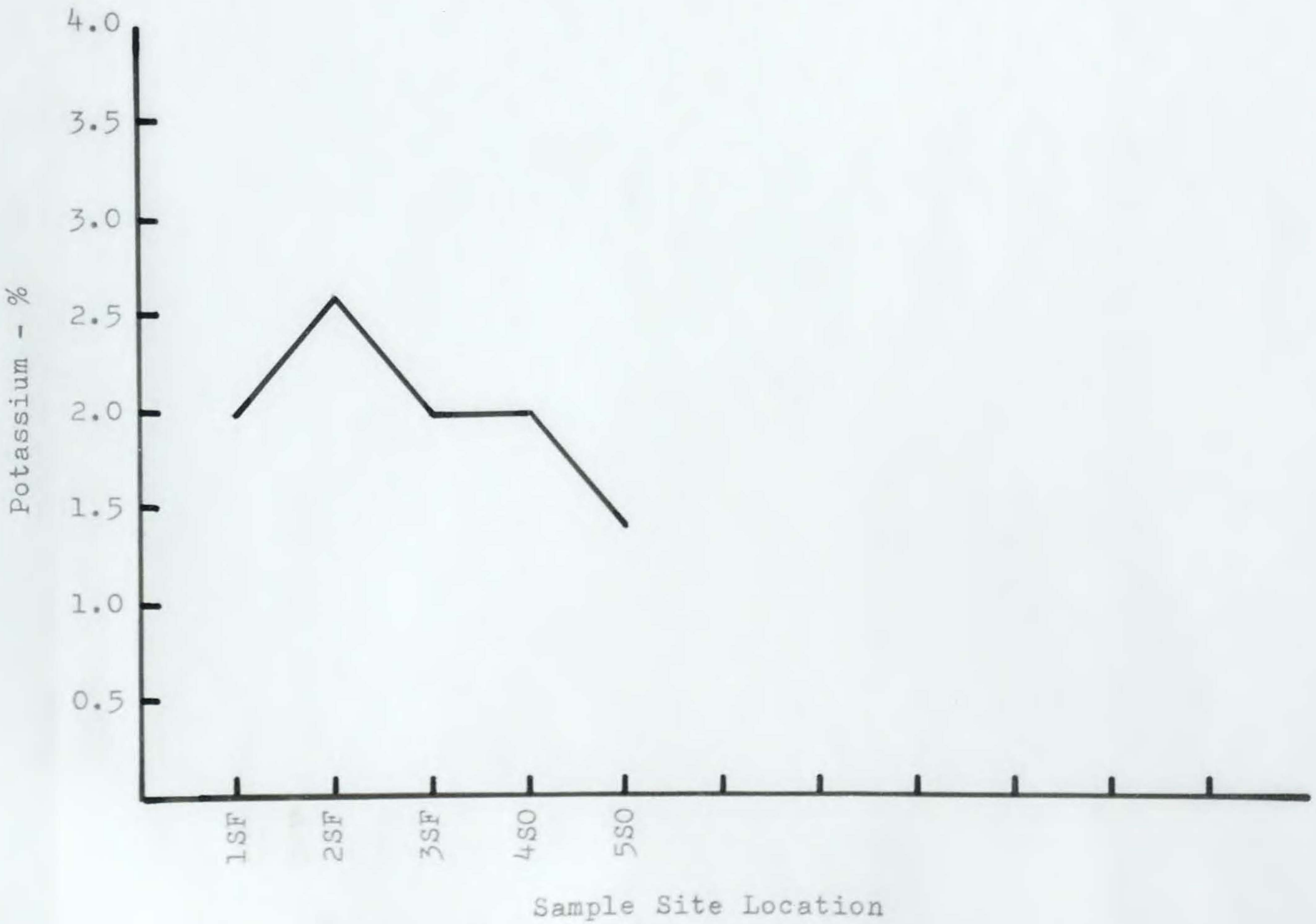
CONCENTRATION OF POTASSIUM IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



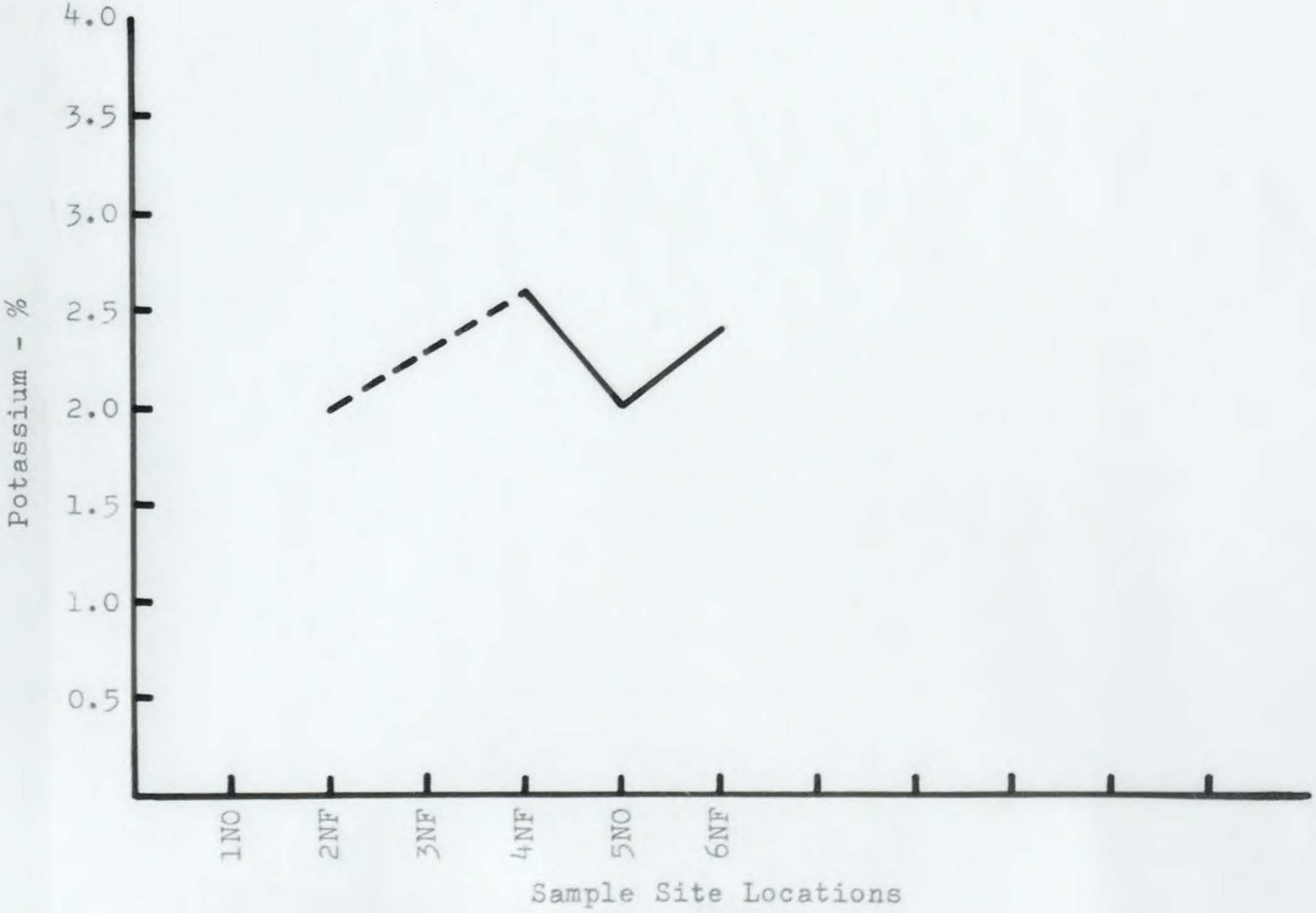
CONCENTRATION OF POTASSIUM IN NEW MEXICAN LOCUST

South Fork, Workman Creek



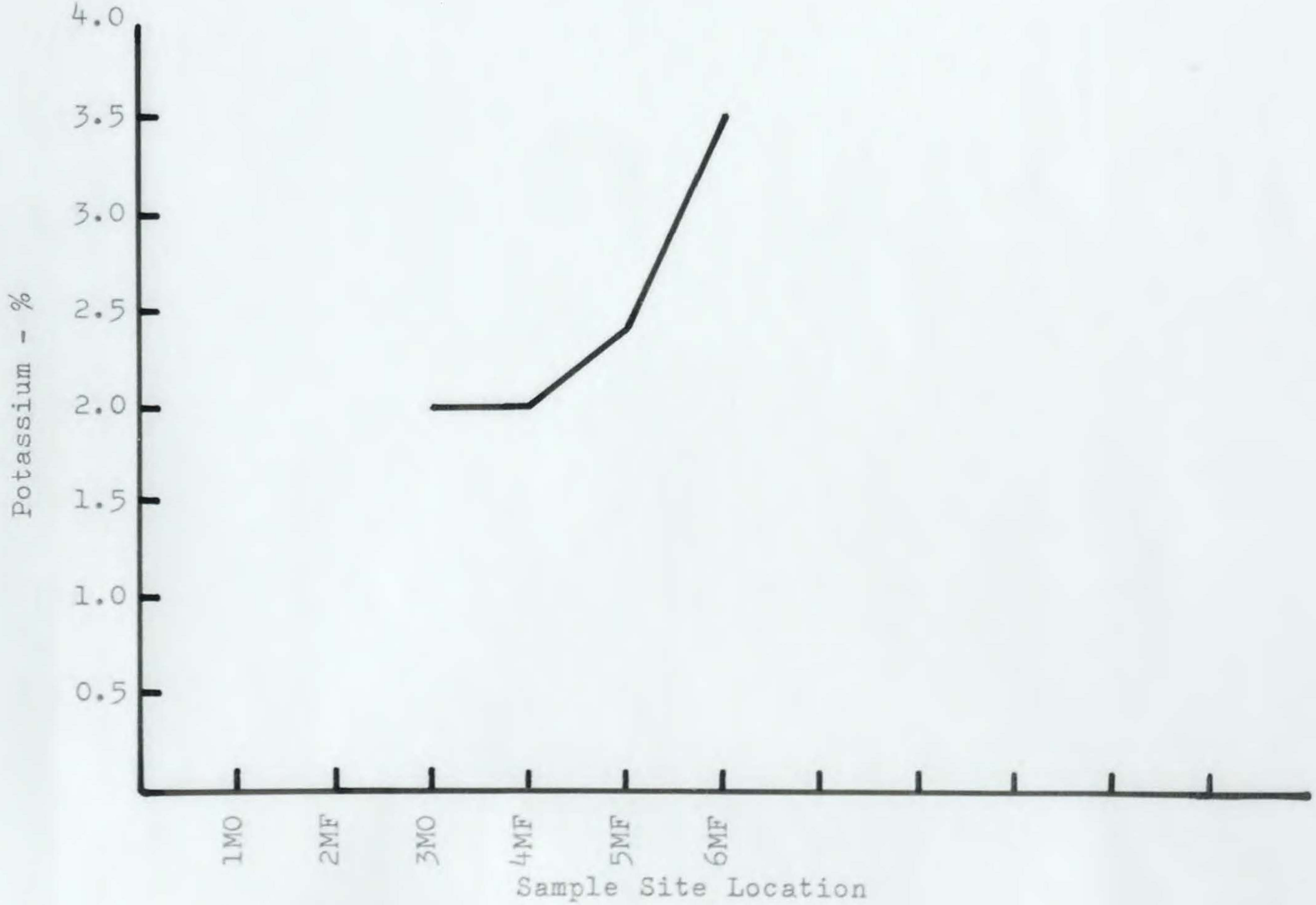
CONCENTRATION OF POTASSIUM IN BRACKEN FERN

North Fork, Workman Creek



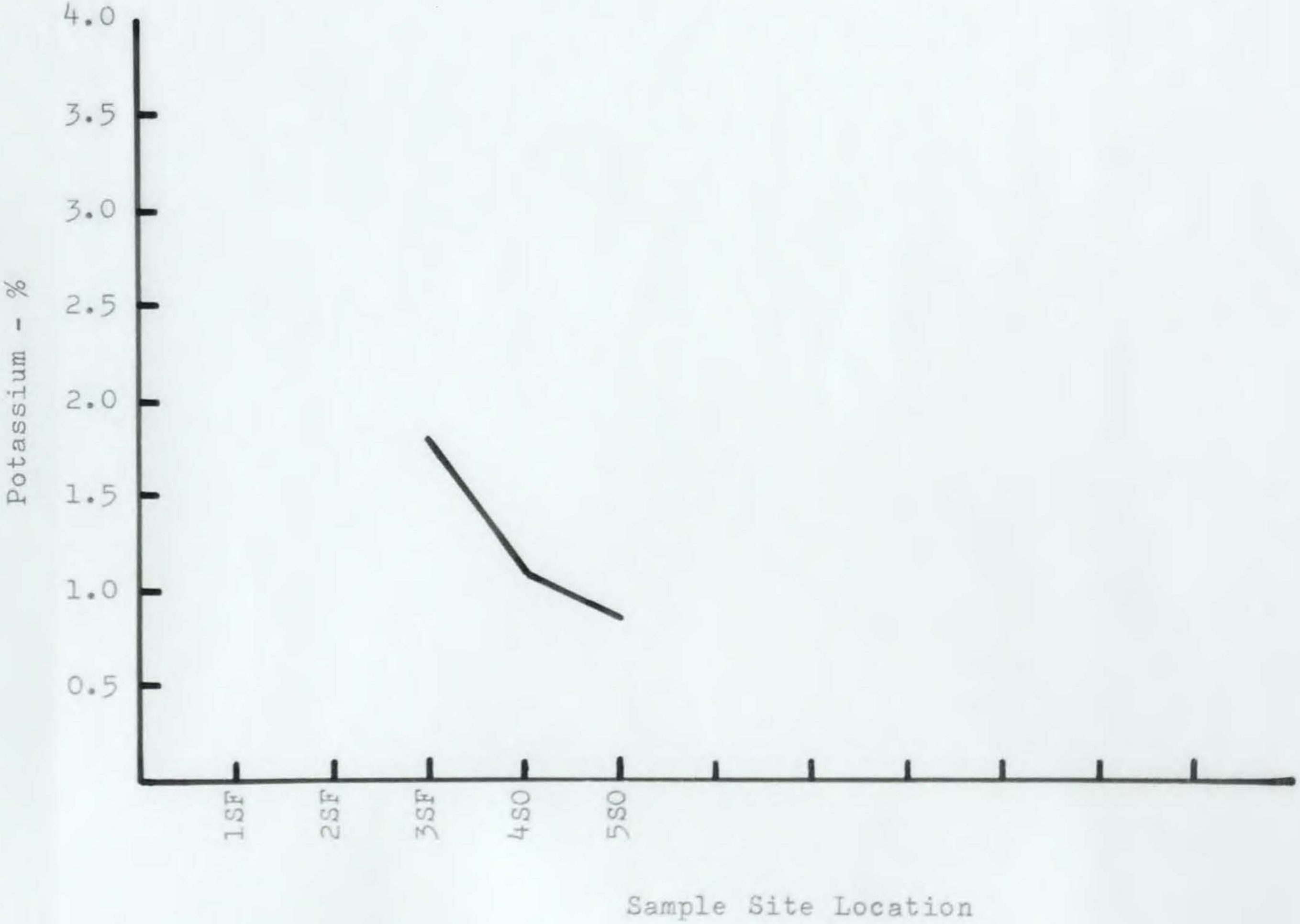
CONCENTRATION OF POTASSIUM IN BRACKEN FERN

Middle Fork, Workman Creek



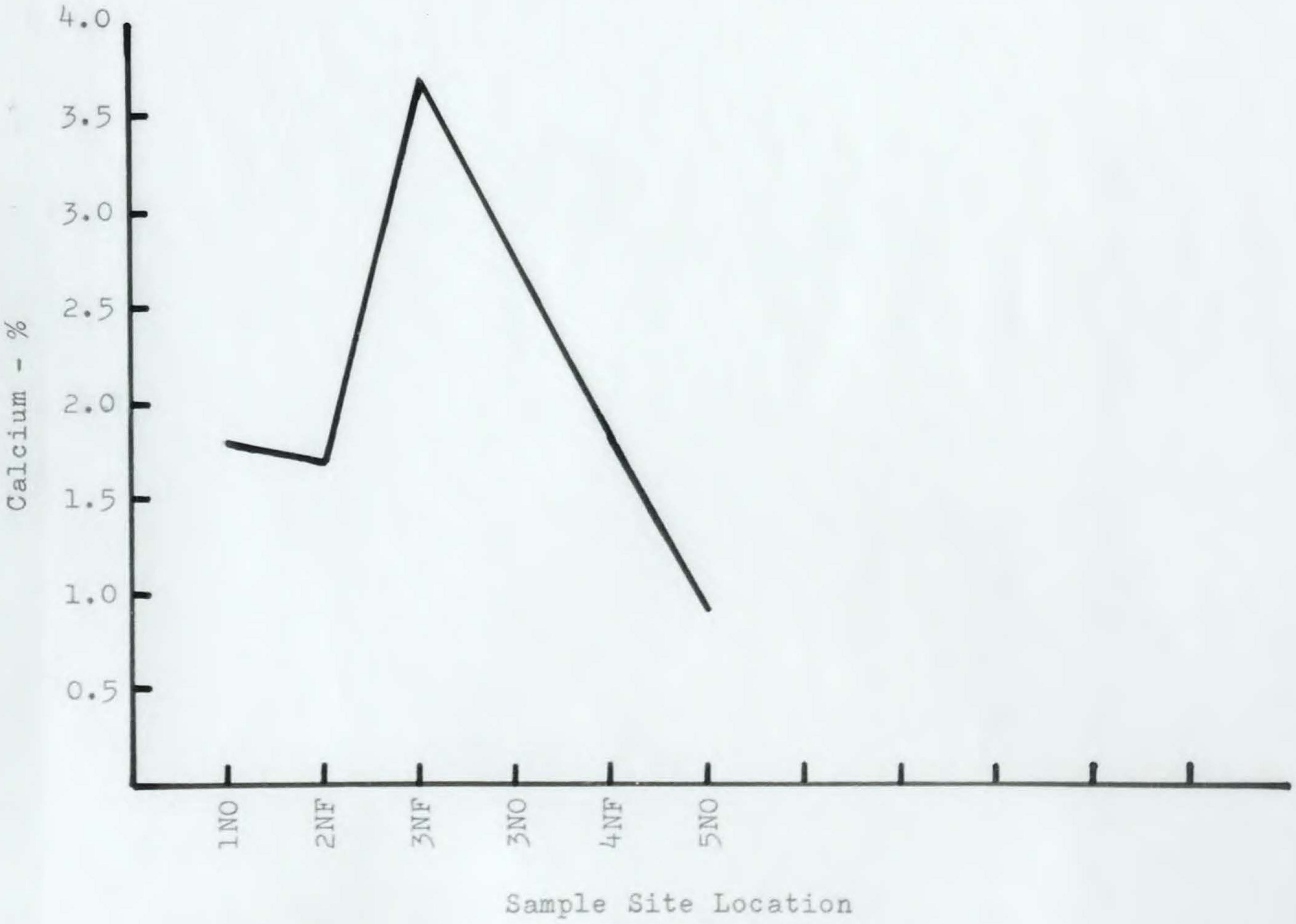
CONCENTRATION OF POTASSIUM IN BRACKEN FERN

South Fork, Workman Creek



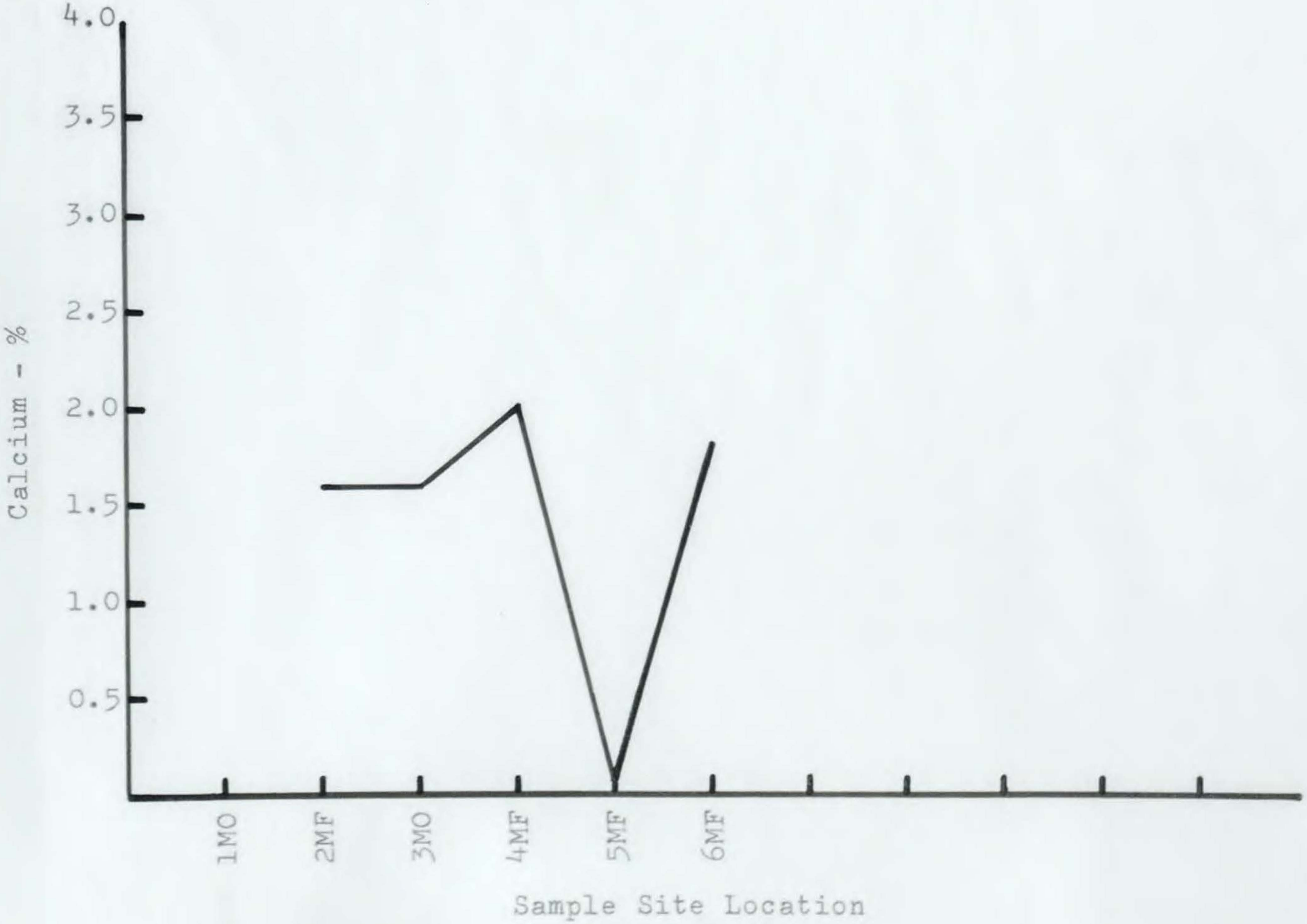
CONCENTRATION OF CALCIUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



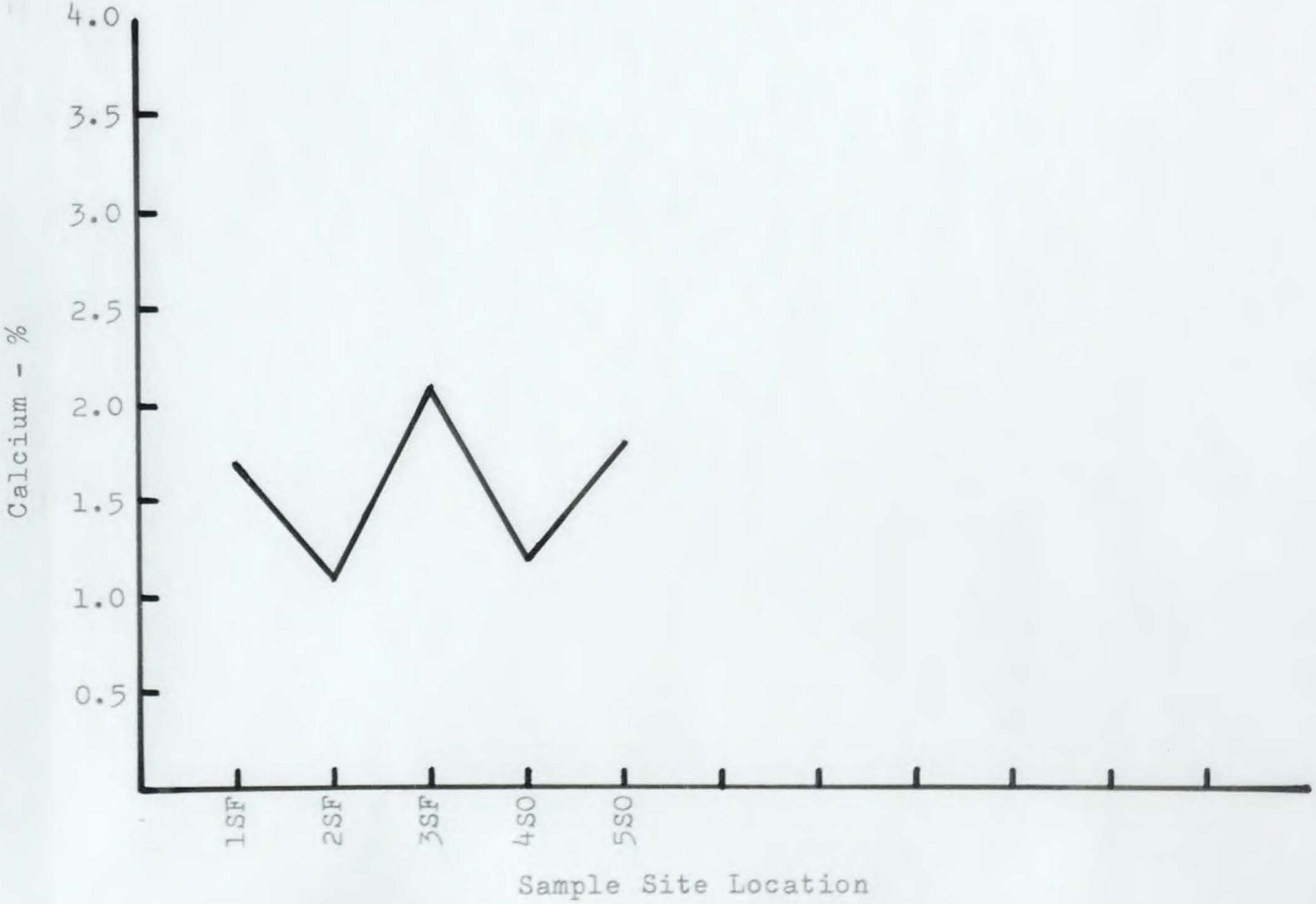
CONCENTRATION OF CALCIUM IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



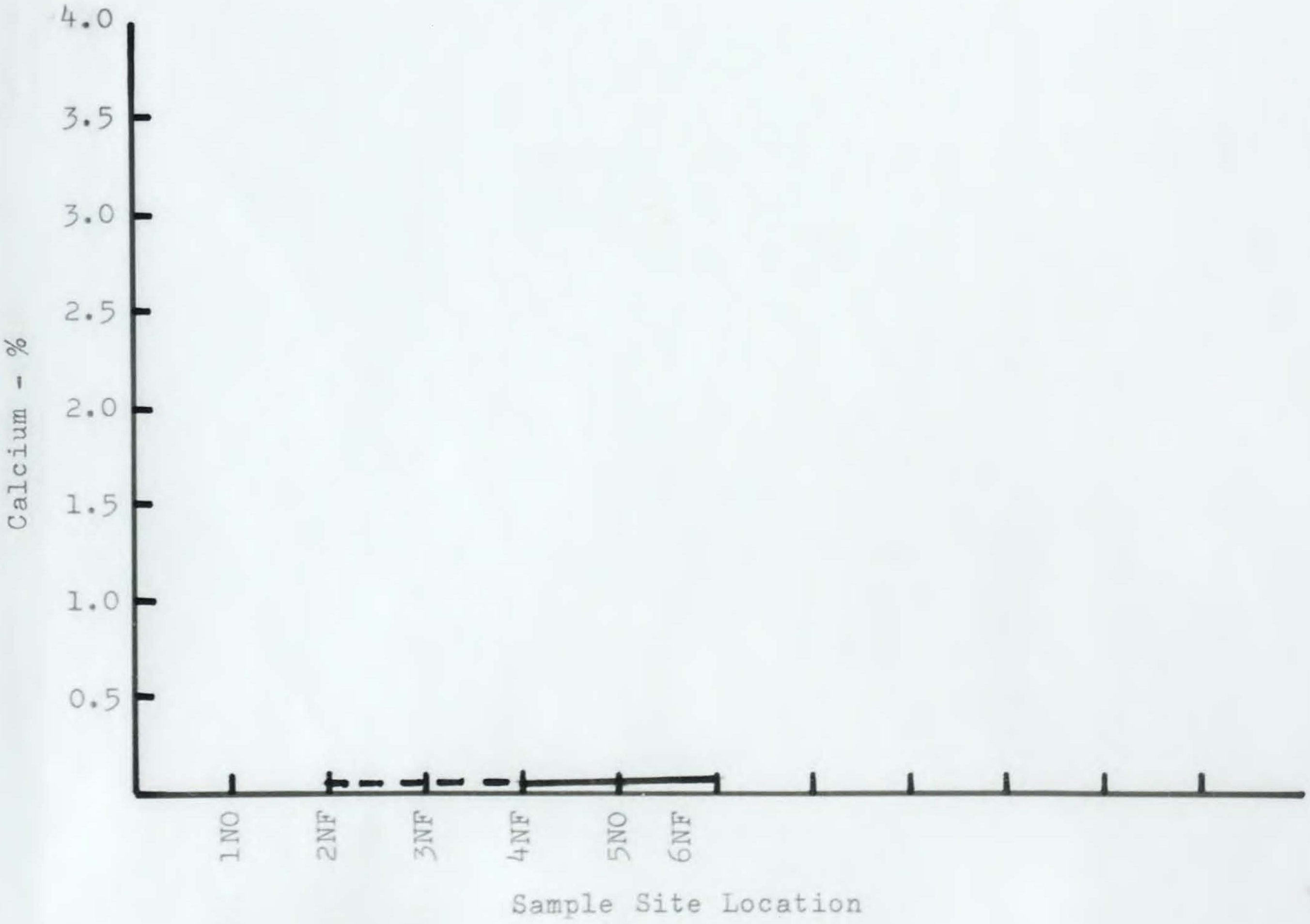
CONCENTRATION OF CALCIUM IN NEW MEXICAN LOCUST

South Fork, Workman Creek



CONCENTRATION OF CALCIUM IN BRACKEN FERN

North Fork, Workman Creek



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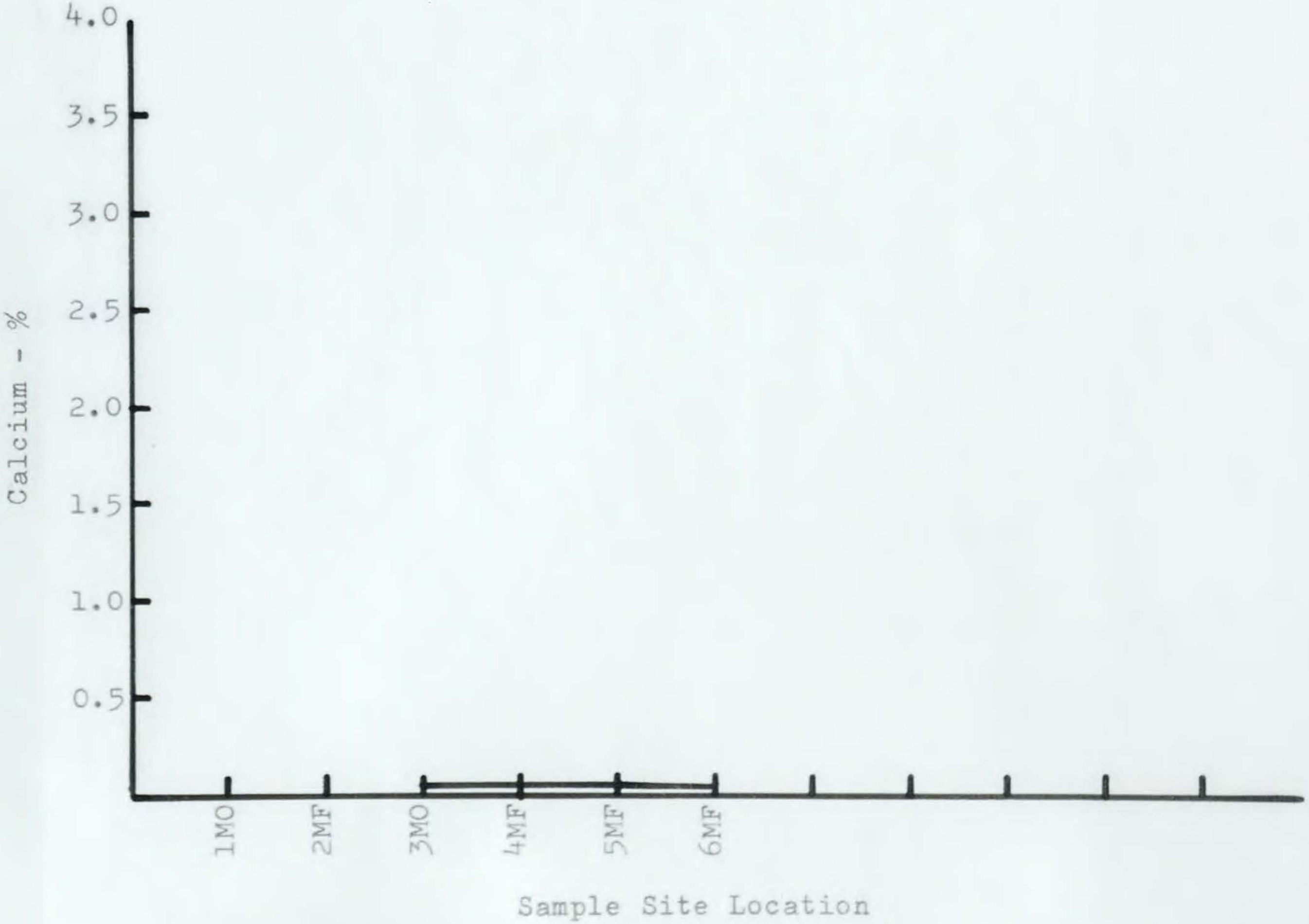
CONCENTRATION OF CALCIUM IN BRACKEN FERN

Middle Fork, Workman Creek



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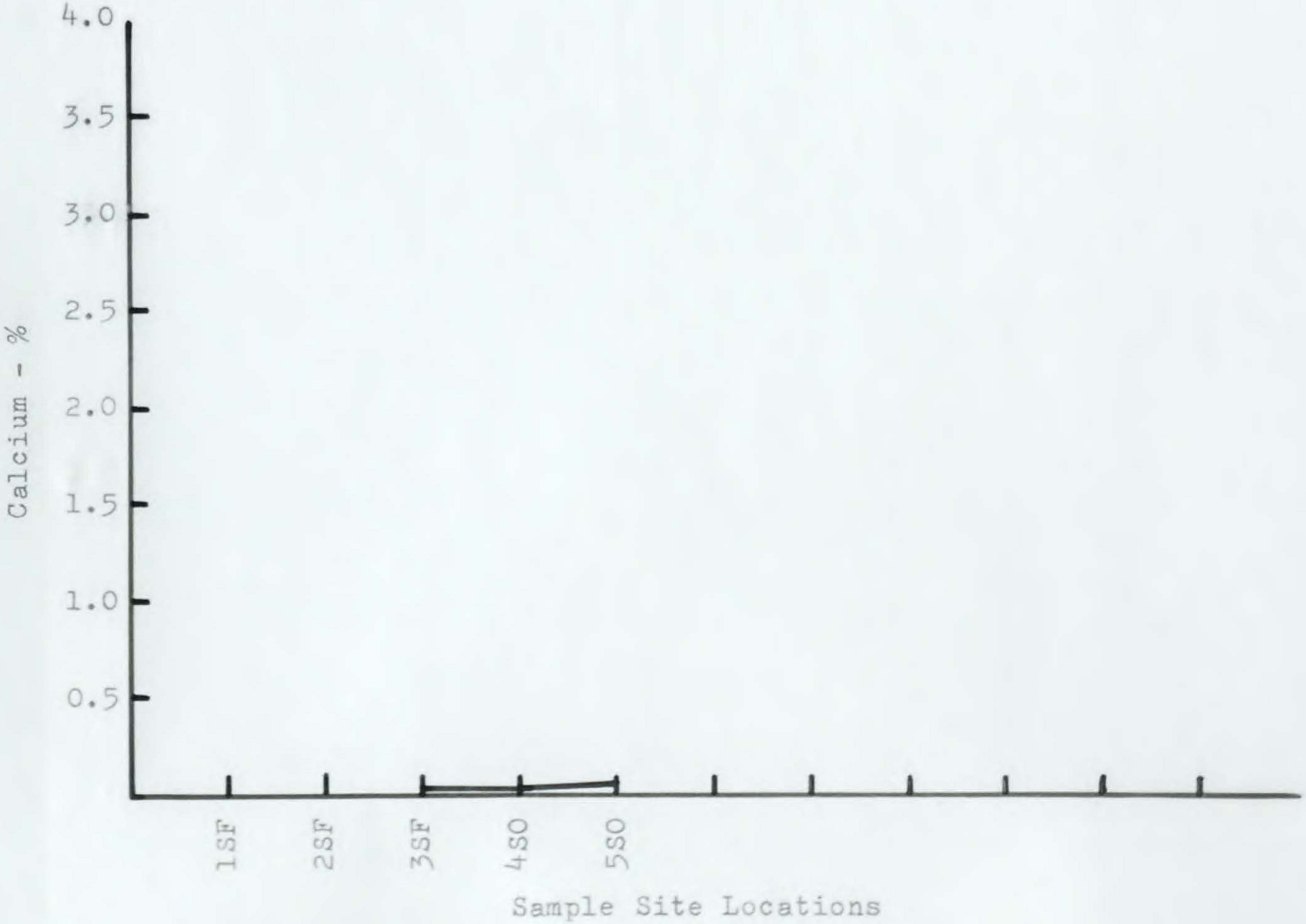
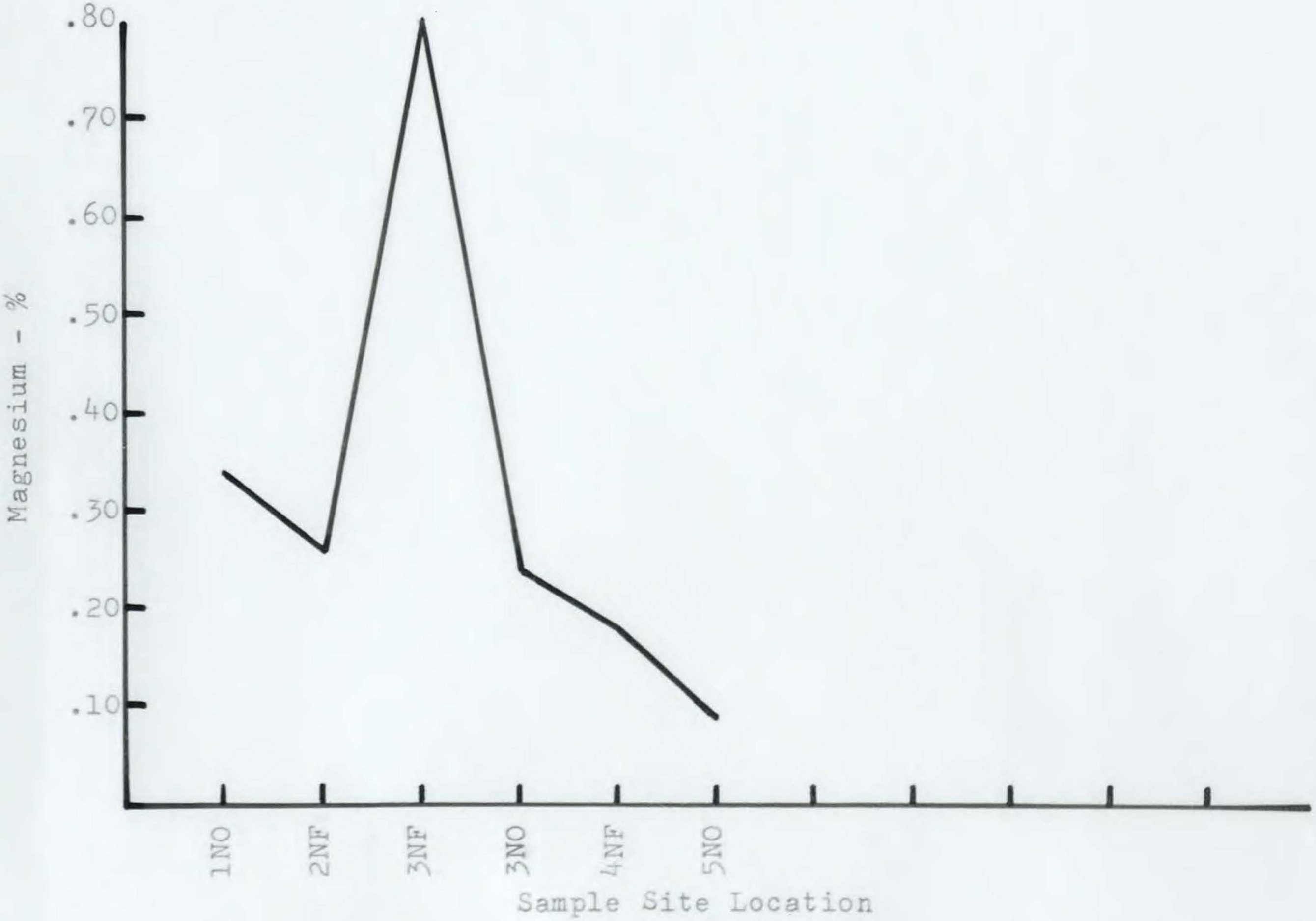
South Fork, Workman Creek



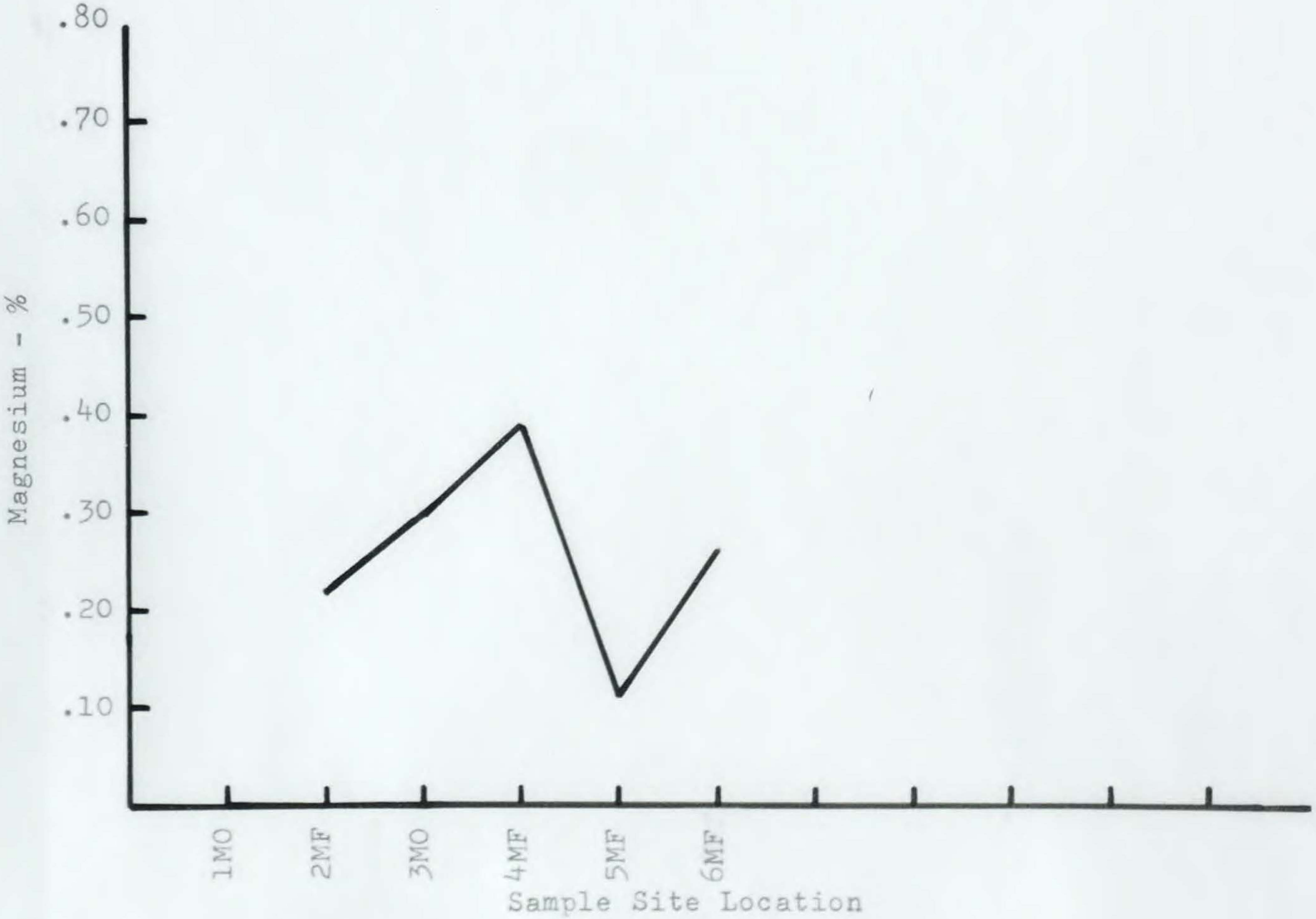
CONCENTRATION OF MAGNESIUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



CONCENTRATION OF MAGNESIUM IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



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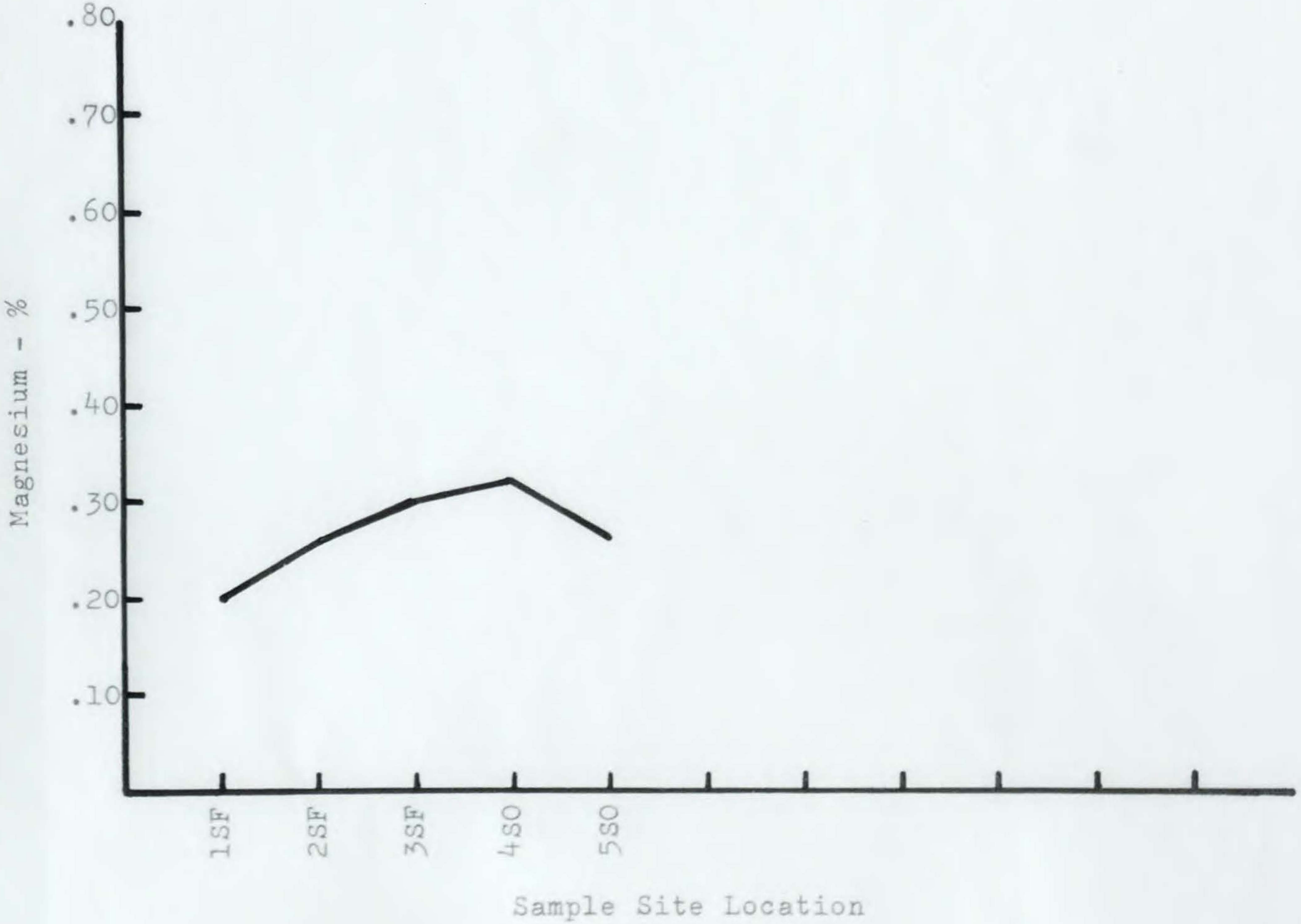
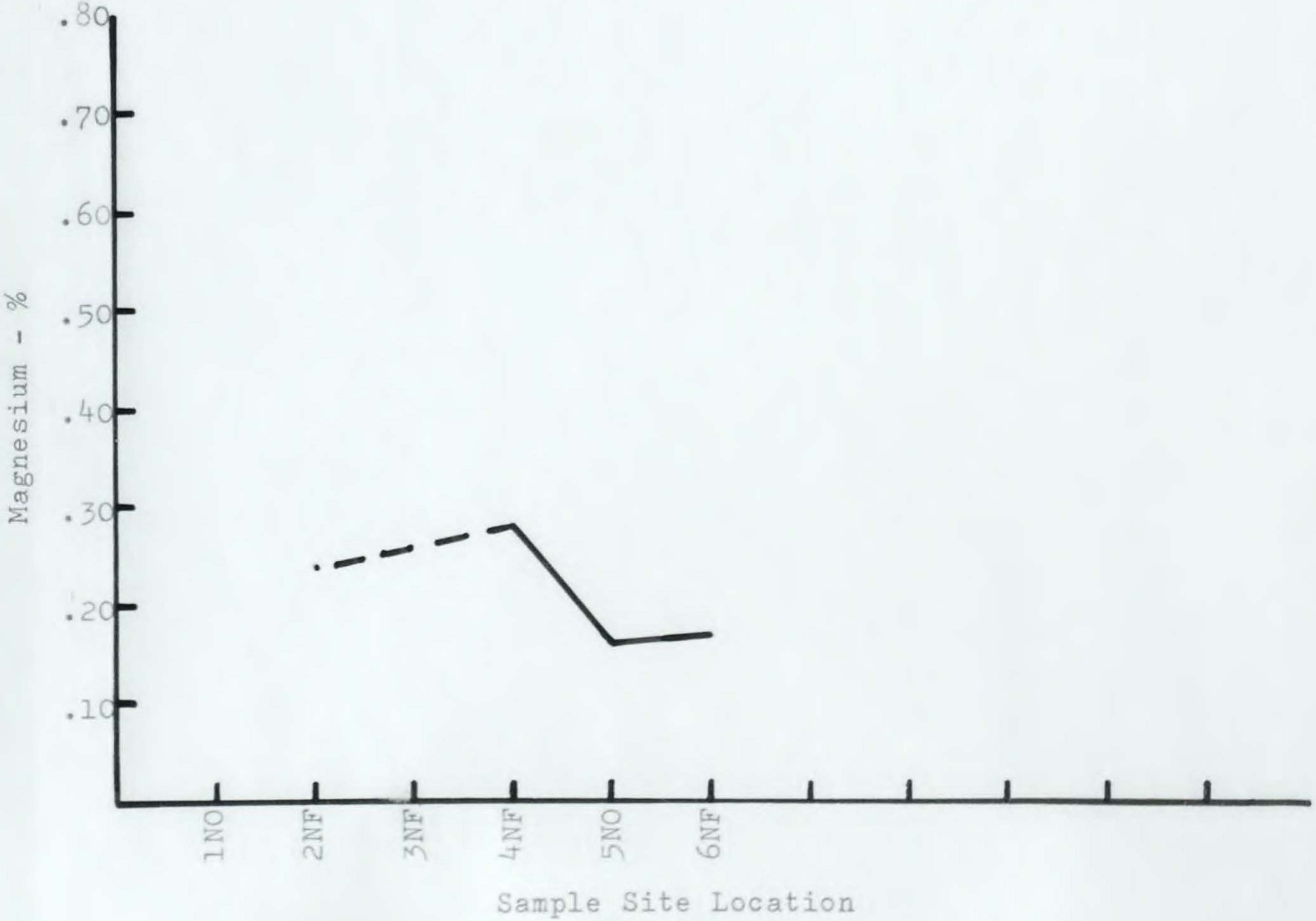
South Fork, Workman Creek



CONCENTRATION OF MAGNESIUM IN BRACKEN FERN

North Fork, Workman Creek



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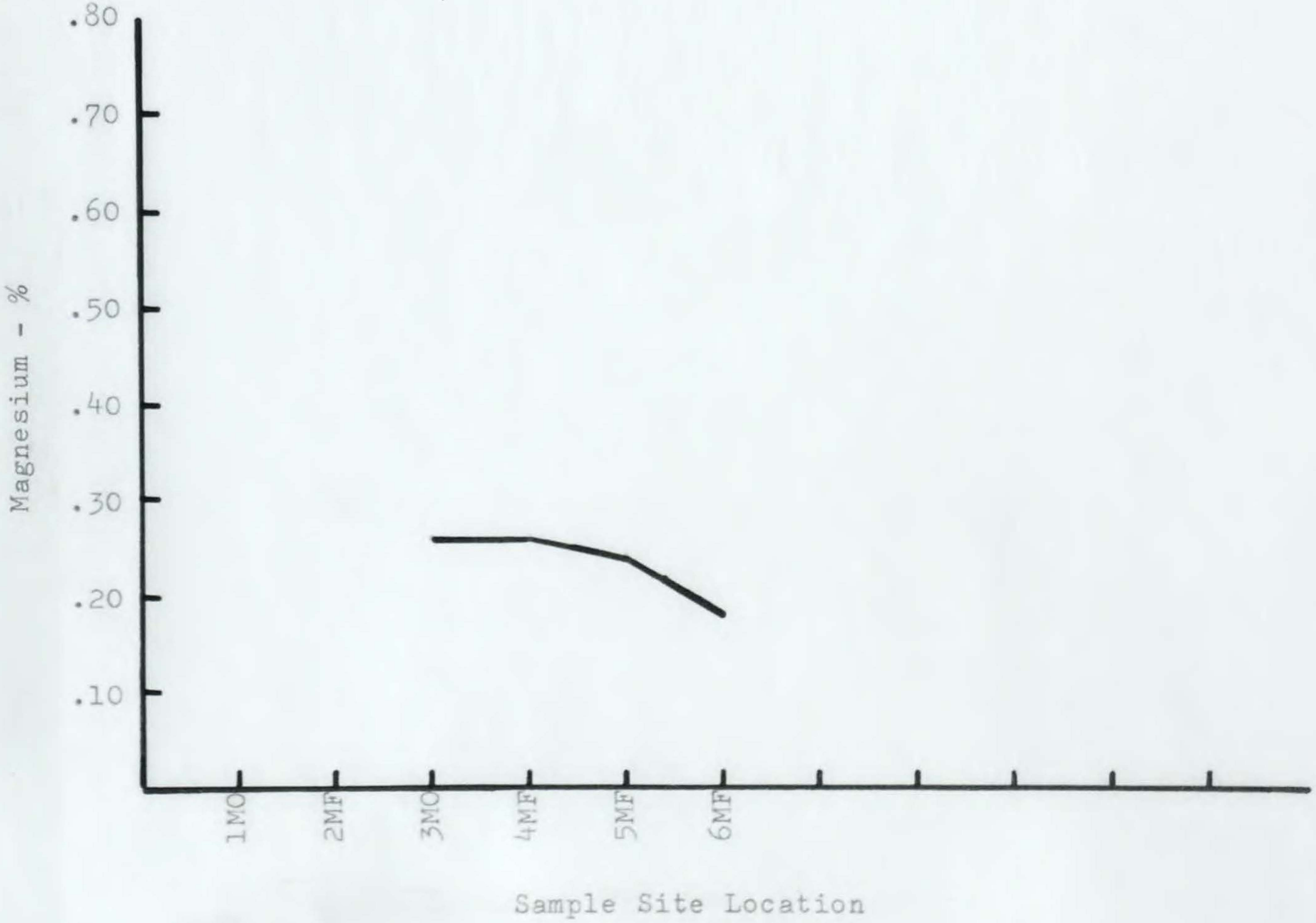
Middle Fork, Workman Creek



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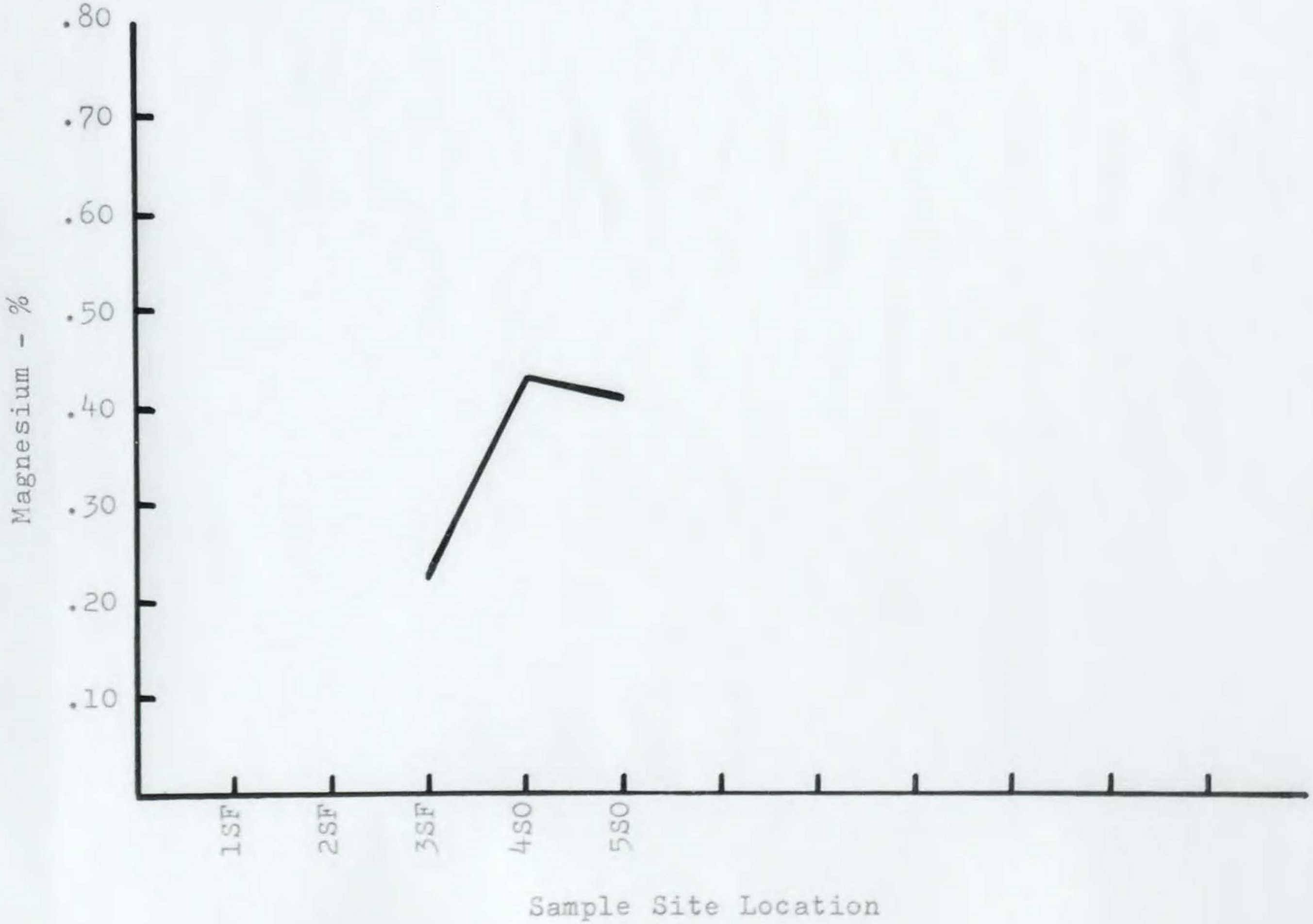
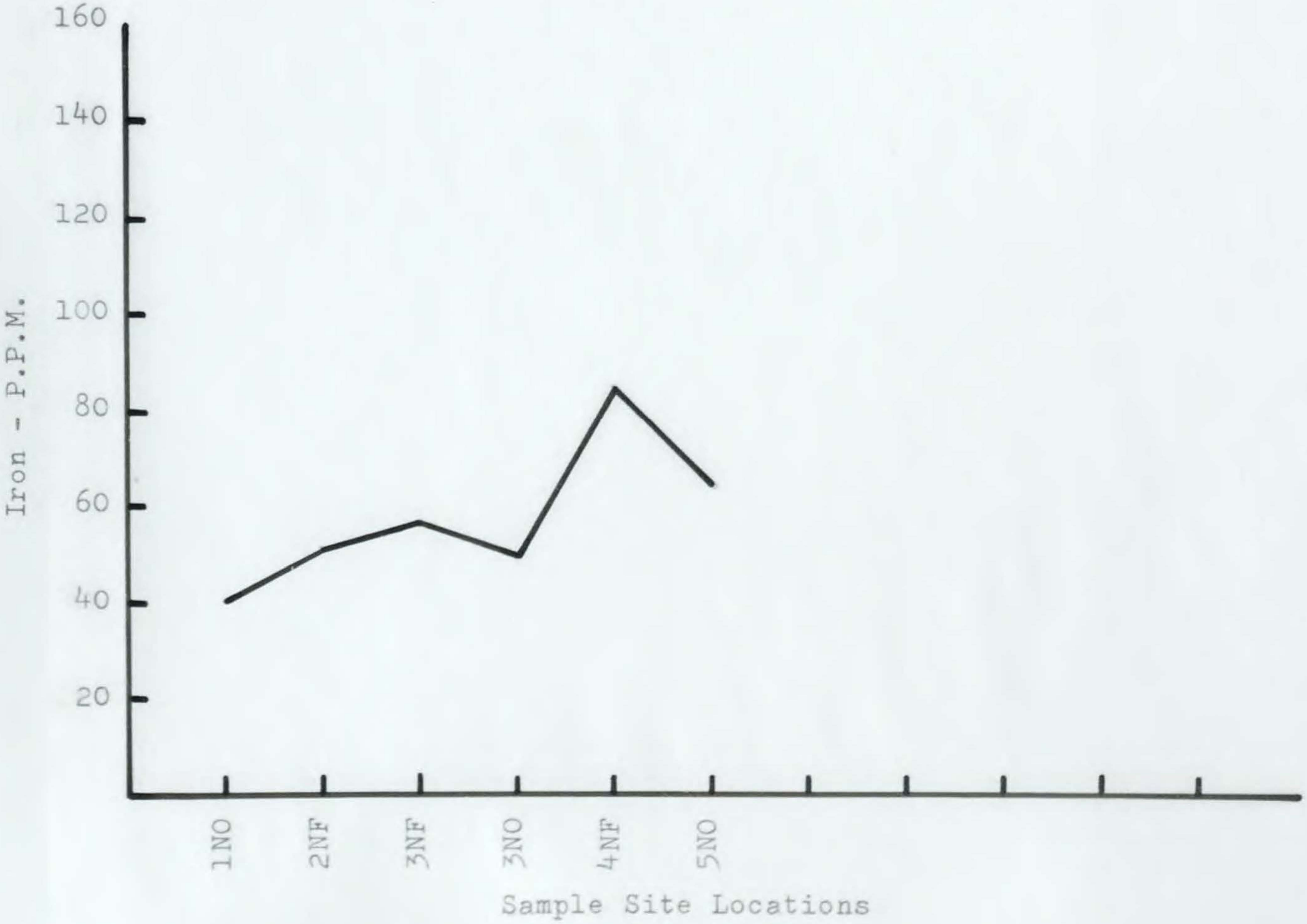
South Fork, Workman Creek



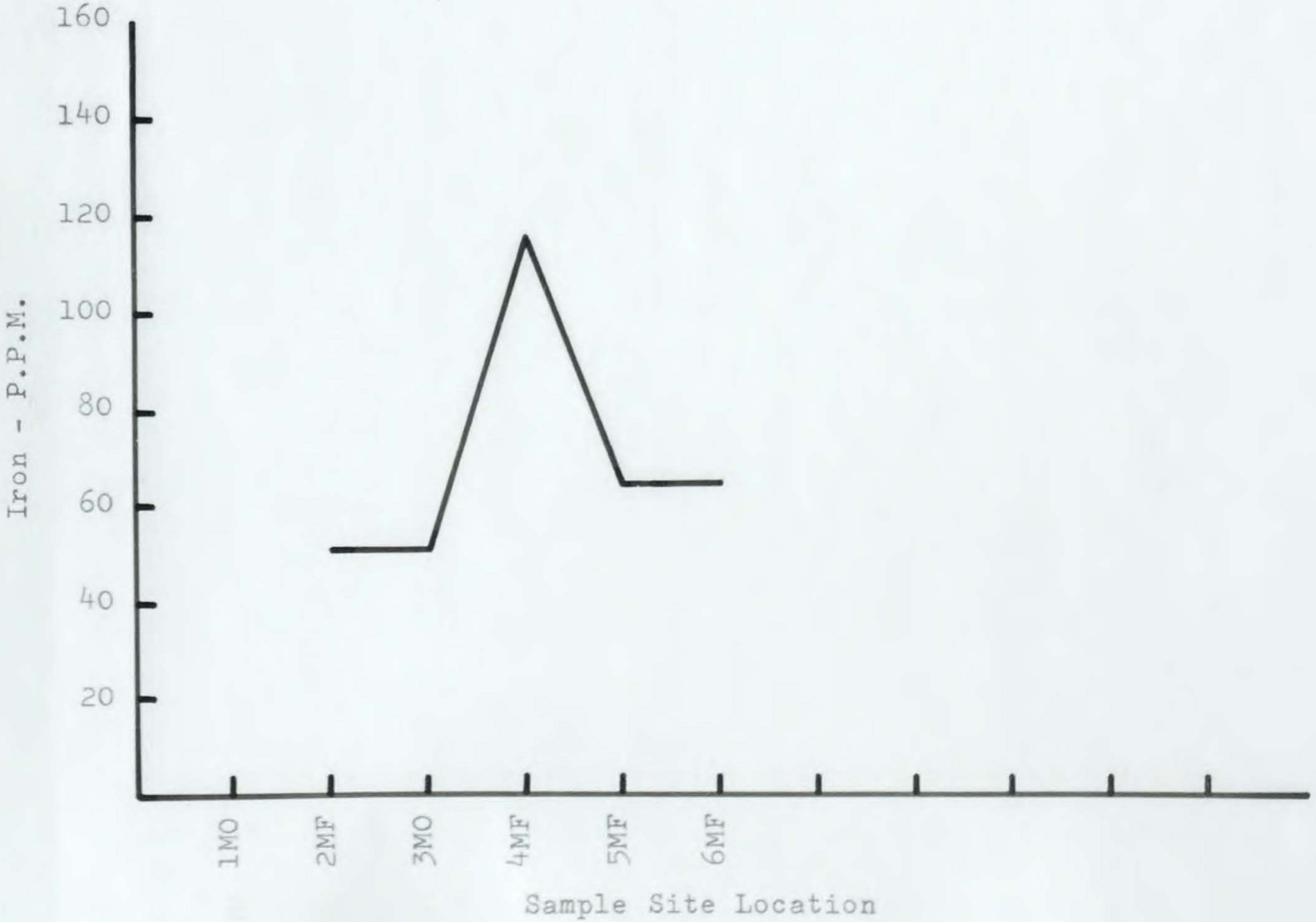
CONCENTRATION OF IRON IN NEW MEXICAN LOCUST

North Fork, Workman Creek



CONCENTRATION OF IRON IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



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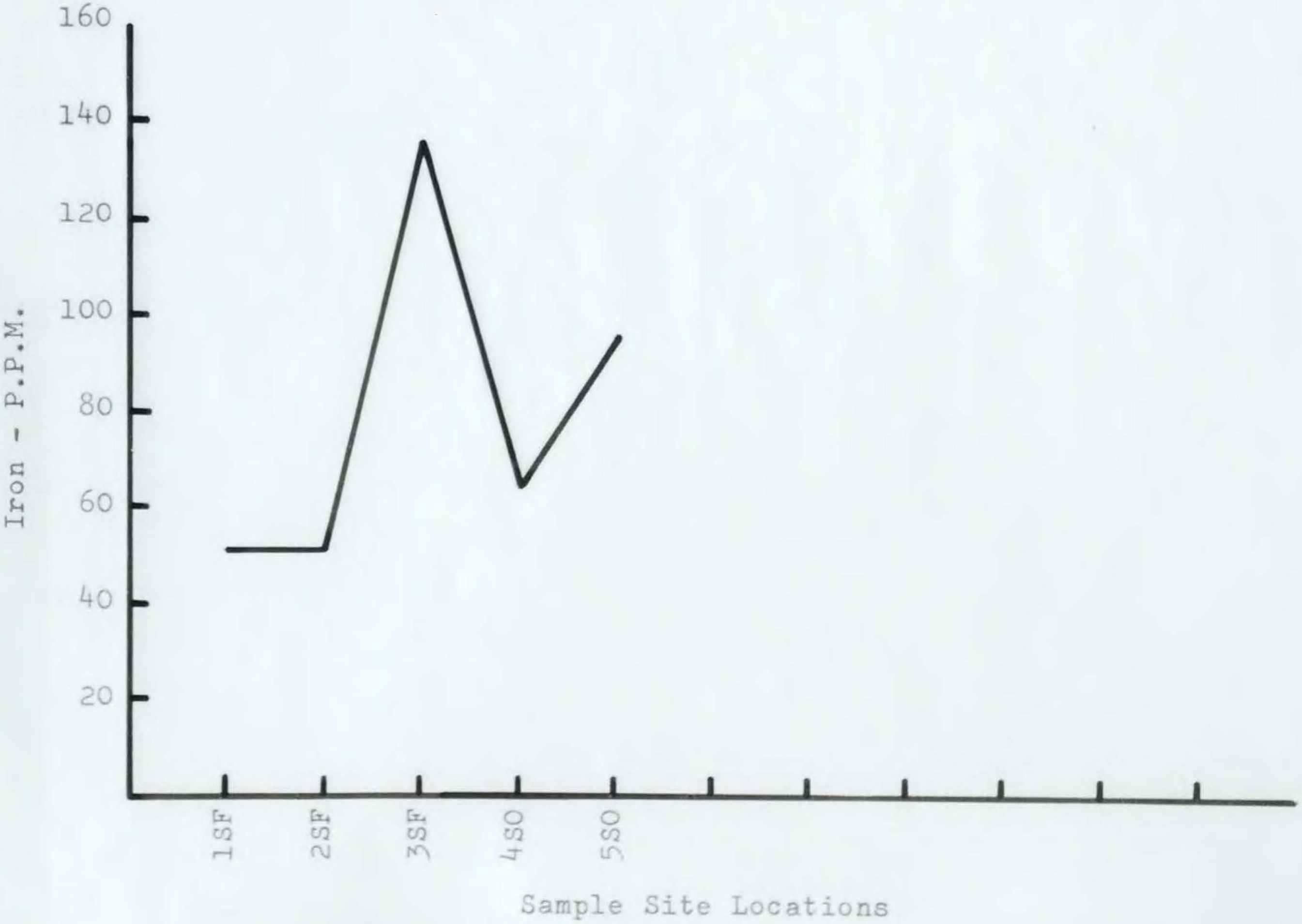
South Fork, Workman Creek



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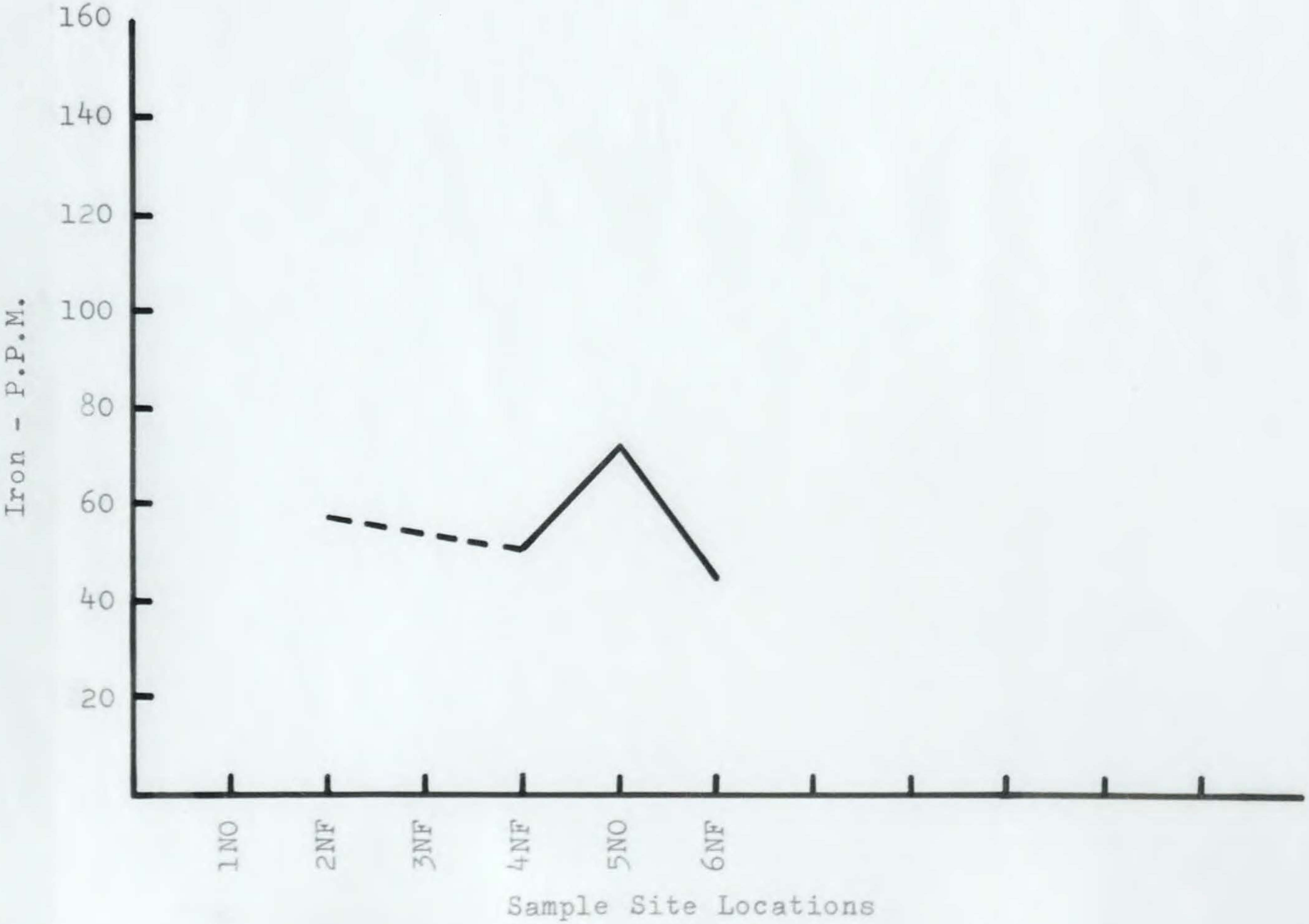
North Fork, Workman Creek



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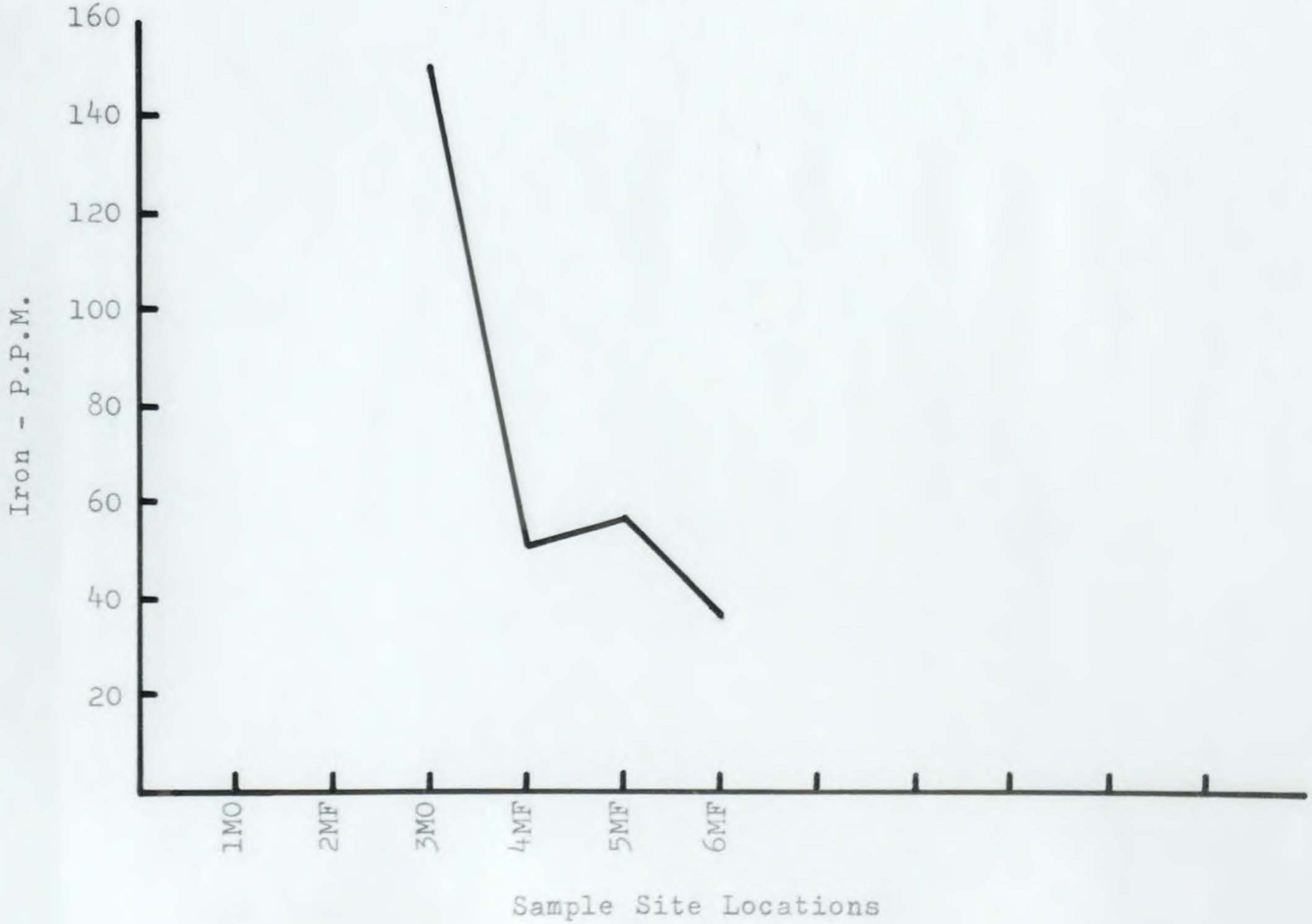
Middle Fork, Workman Creek



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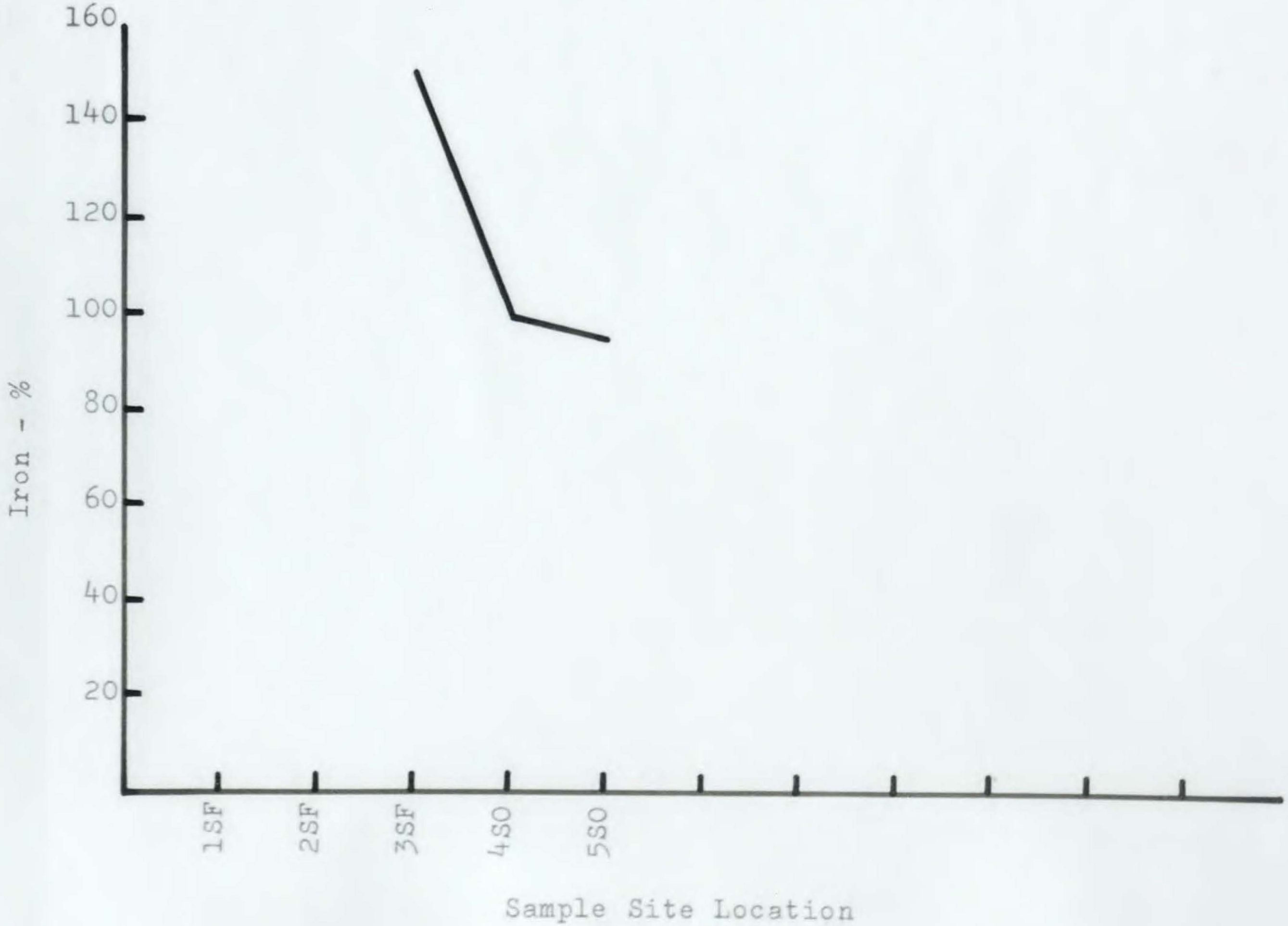
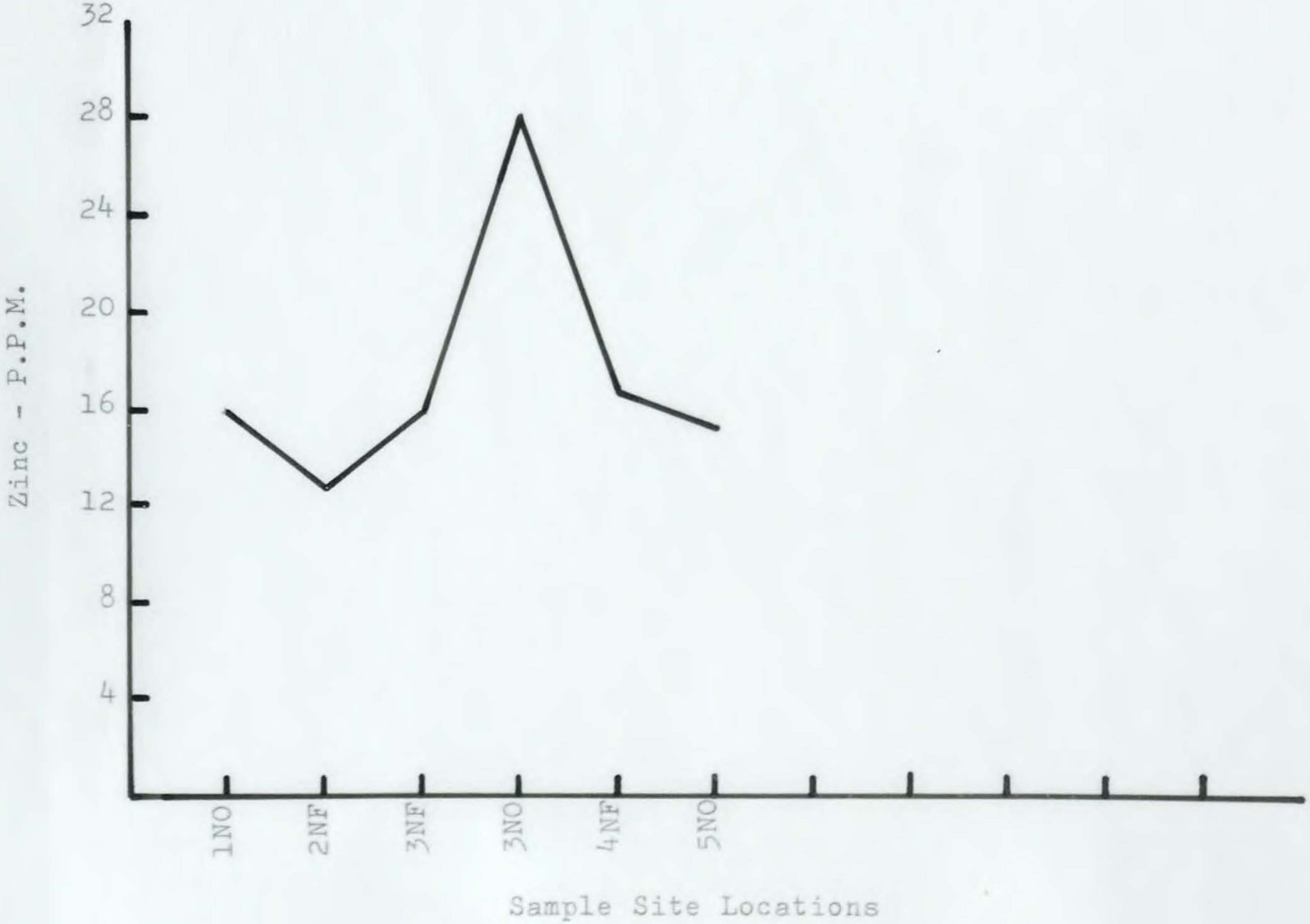
South Fork, Workman Creek



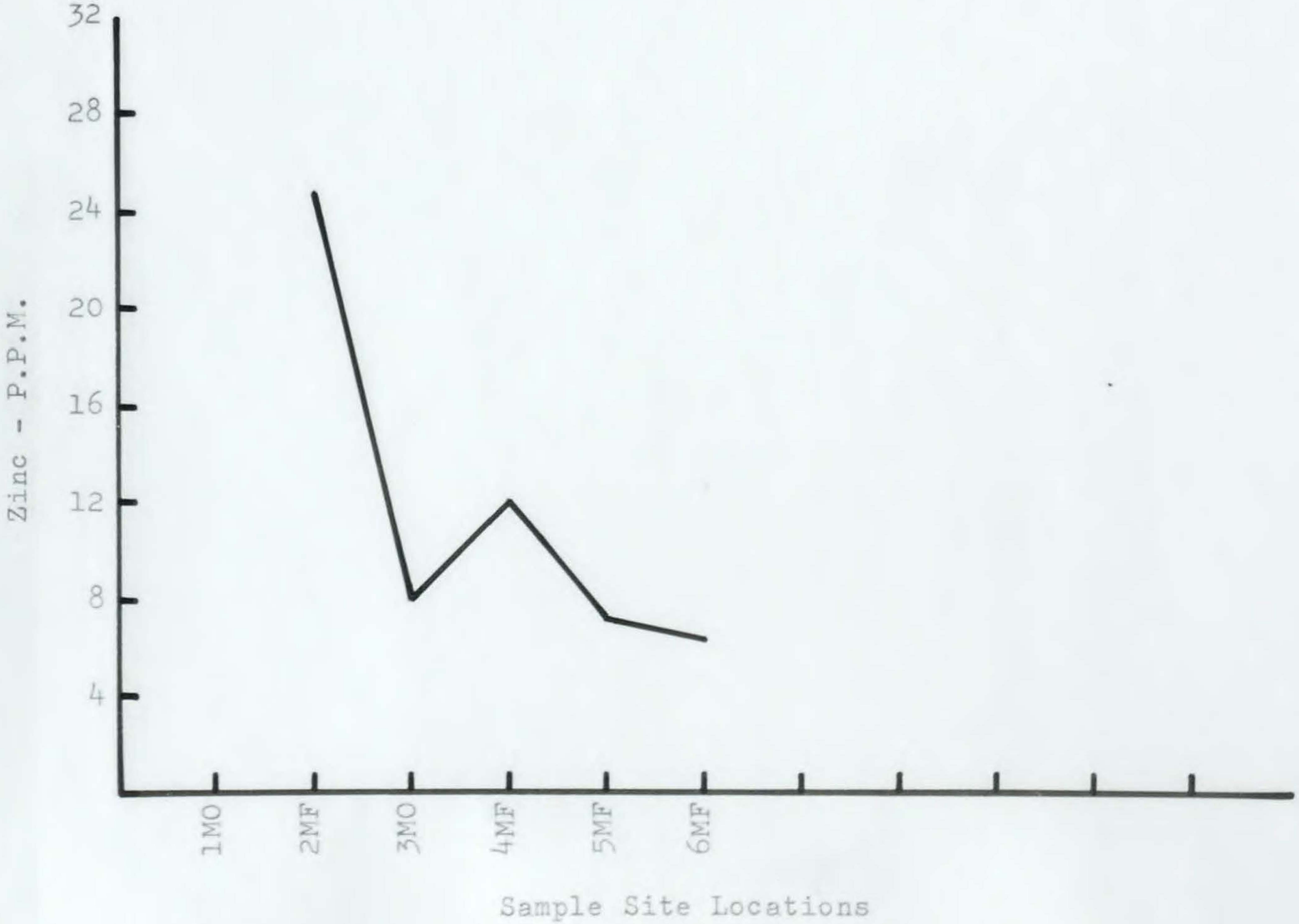
CONCENTRATION OF ZINC IN NEW MEXICAN LOCUST

North Fork, Workman Creek



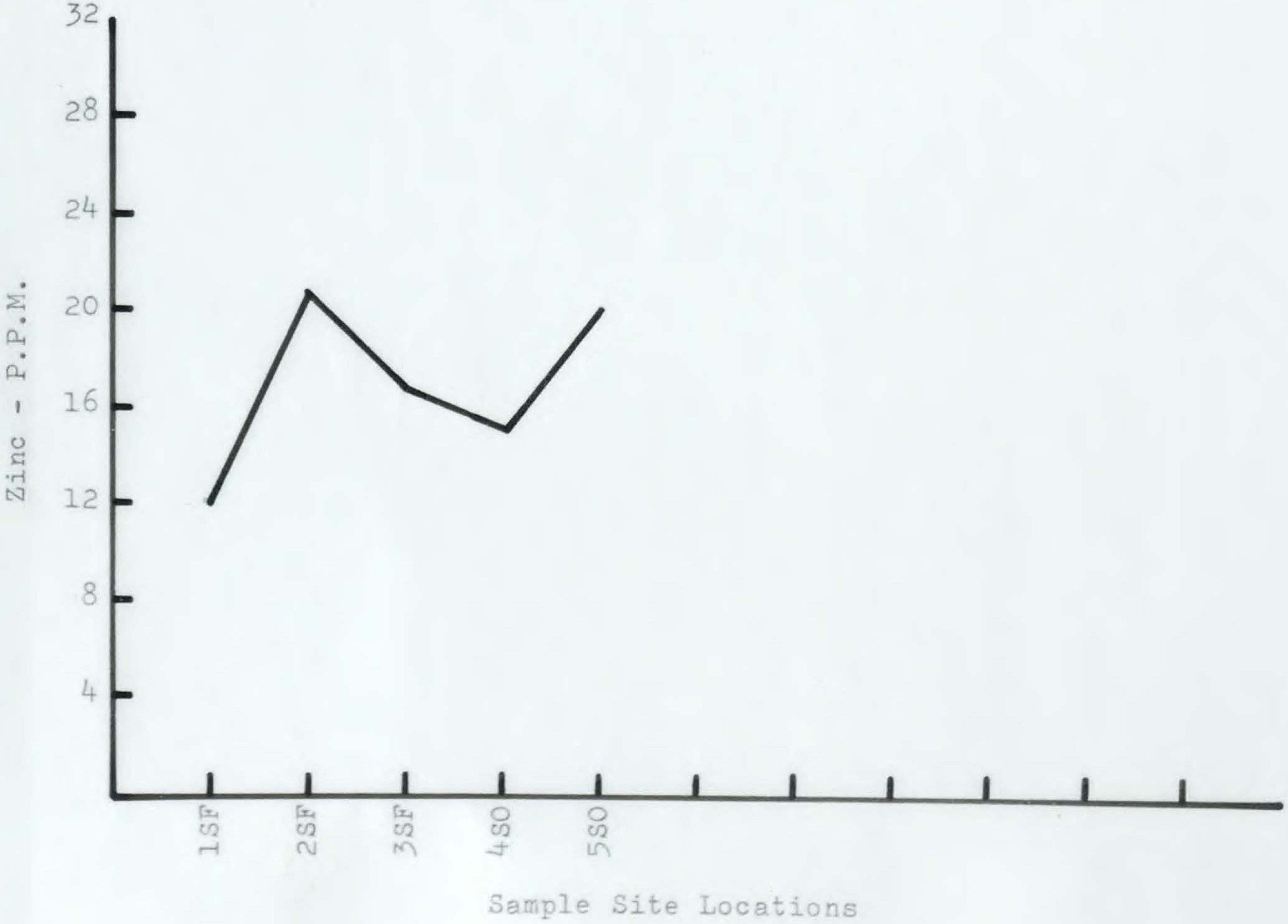
CONCENTRATION OF ZINC IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



CONCENTRATION OF ZINC IN NEW MEXICAN LOCUST

South Fork, Workman Creek



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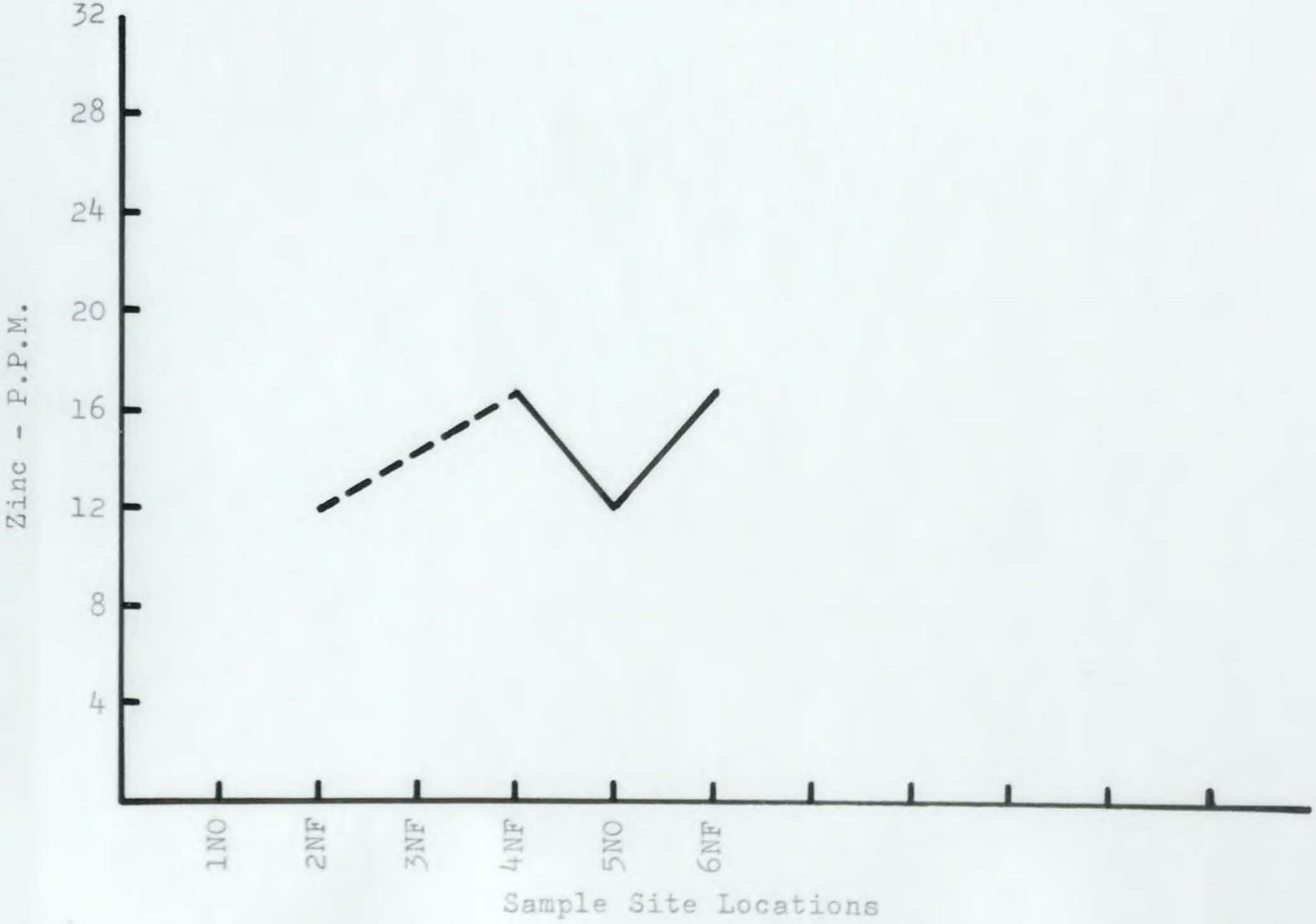
North Fork, Workman Creek



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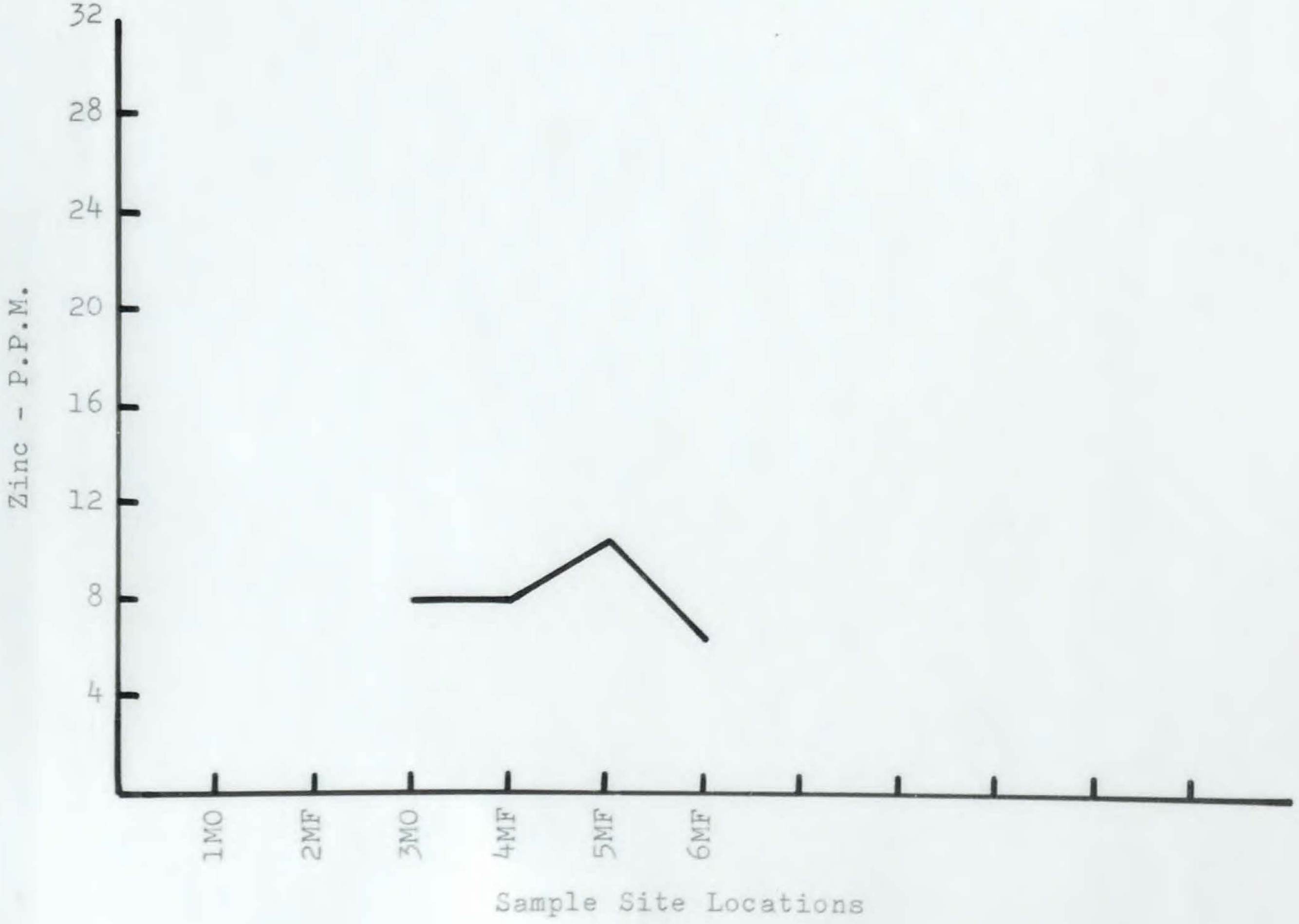
CONCENTRATION OF ZINC IN BRACKEN FERN

Middle Fork, Workman Creek



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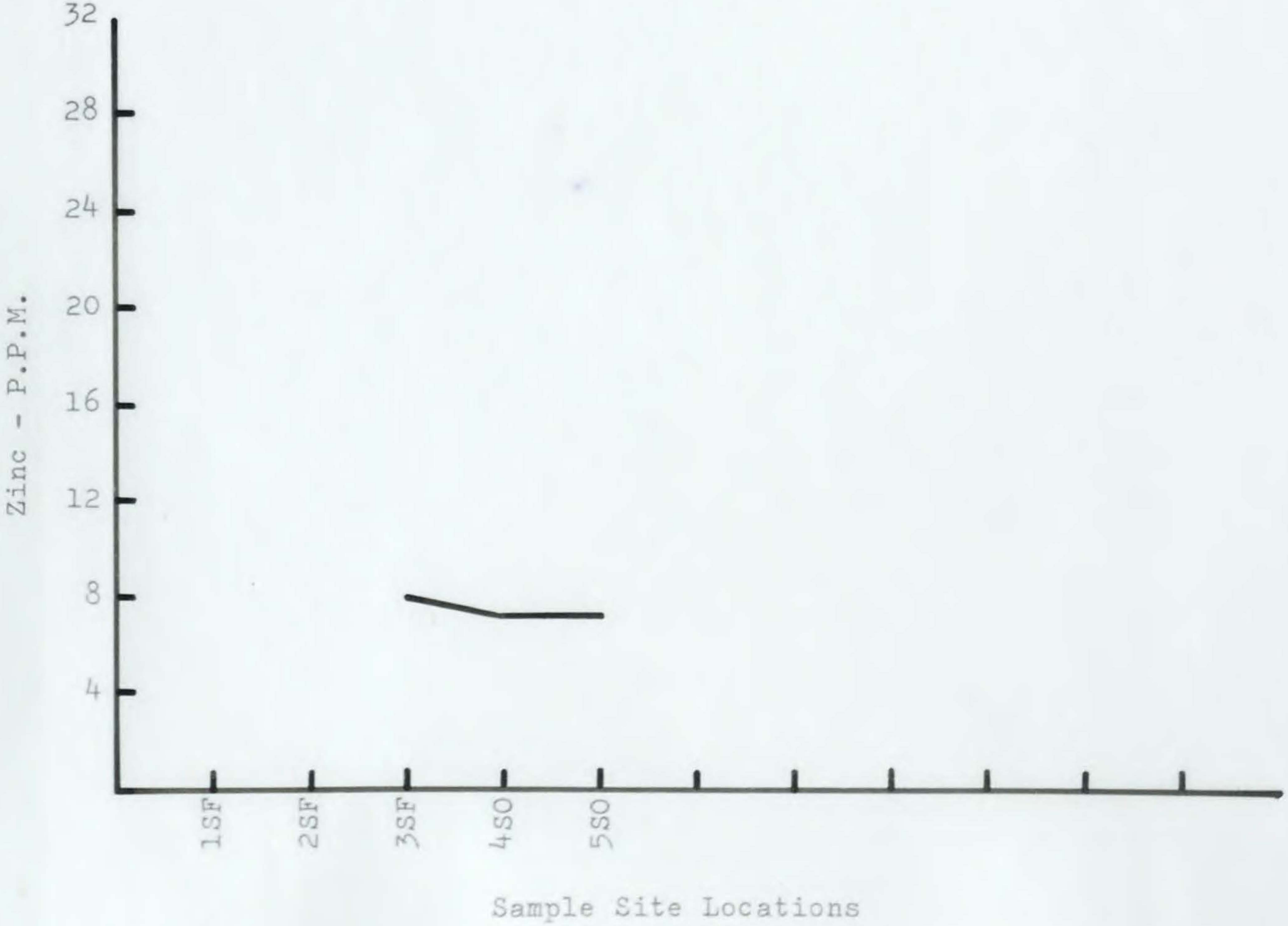
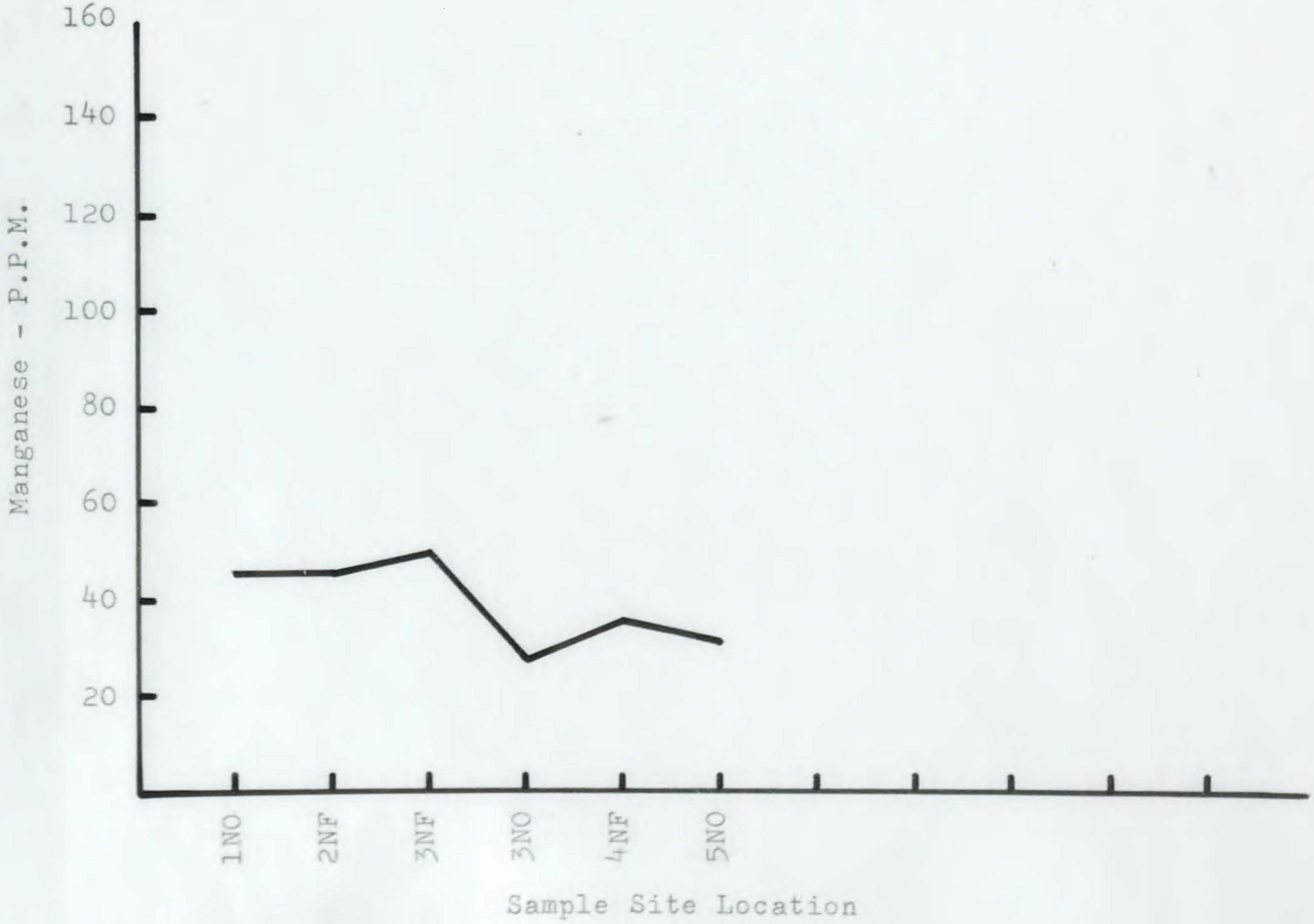
South Fork, Workman Creek



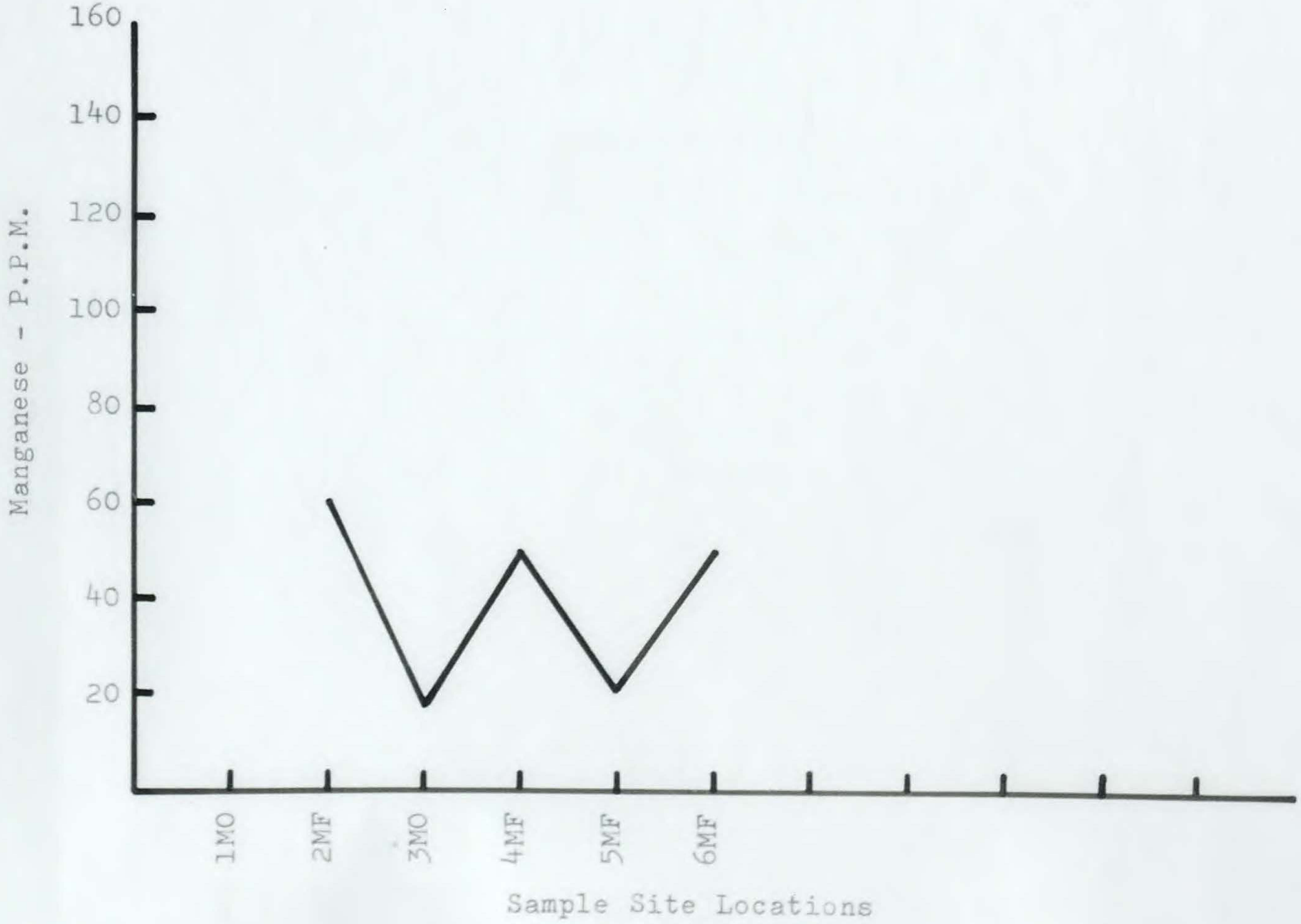
CONCENTRATION OF MANGANESE IN NEW MEXICAN LOCUST

North Fork, Workman Creek



CONCENTRATION OF MANGANESE IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



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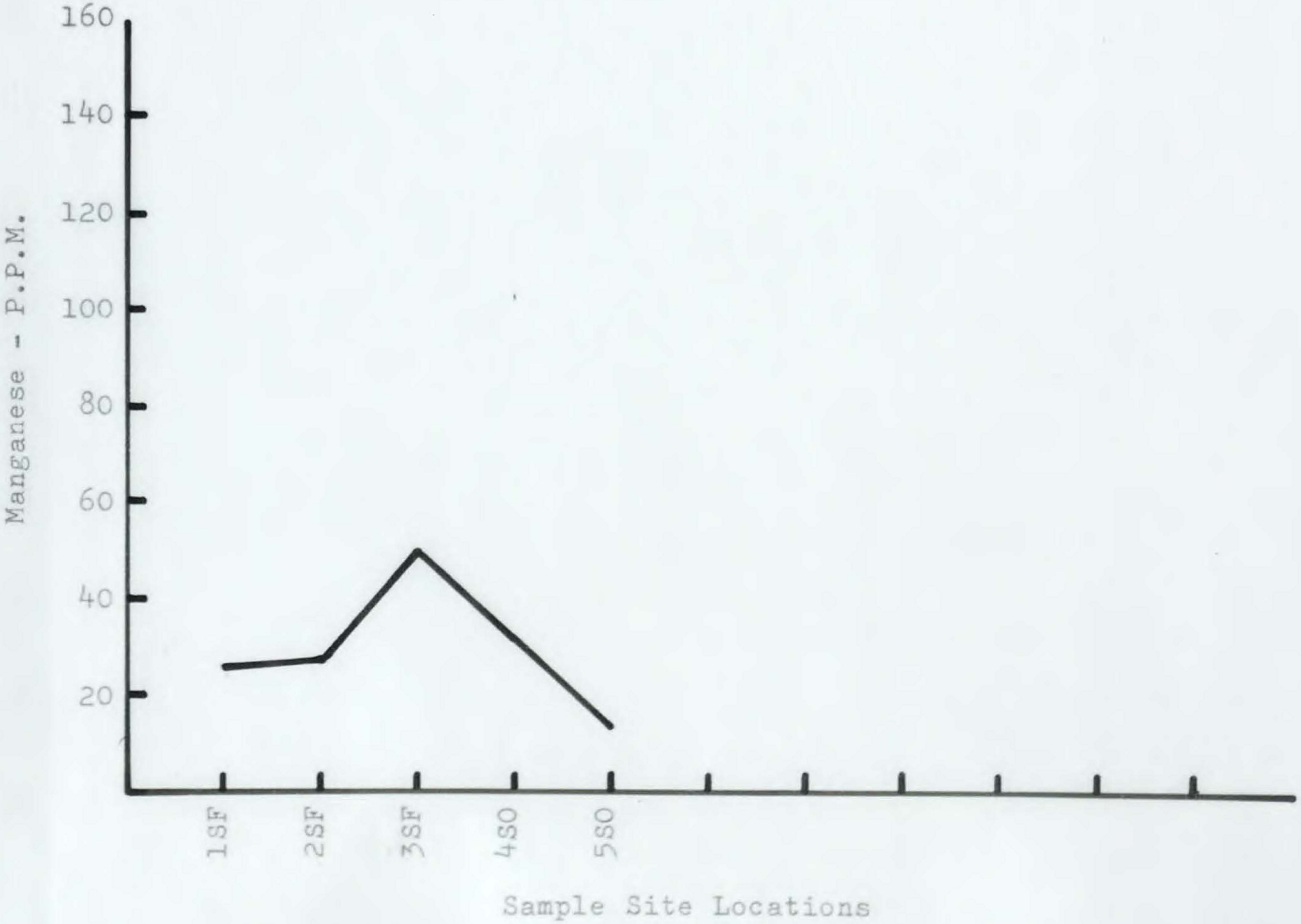
South Fork, Workman Creek



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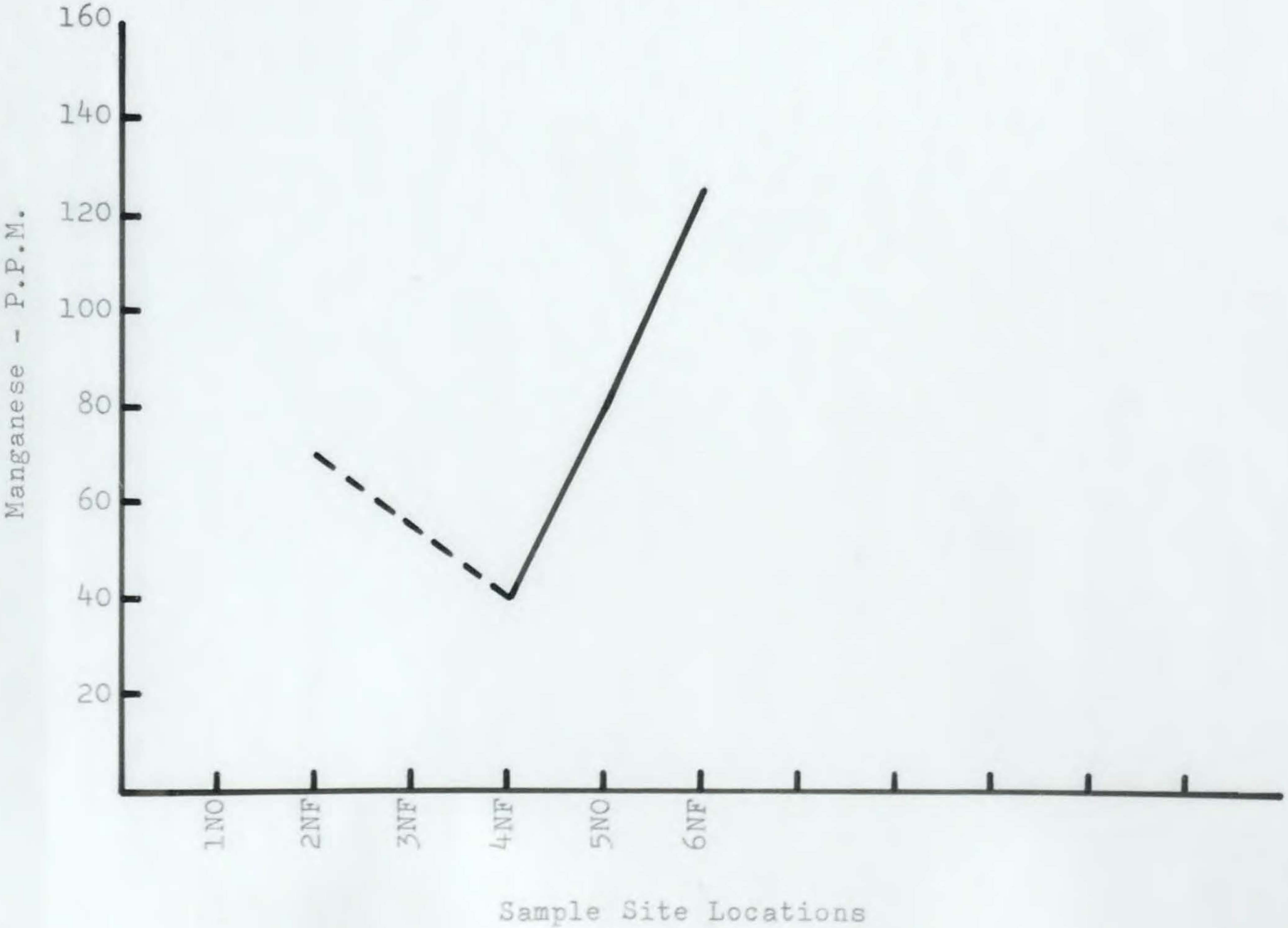
North Fork, Workman Creek



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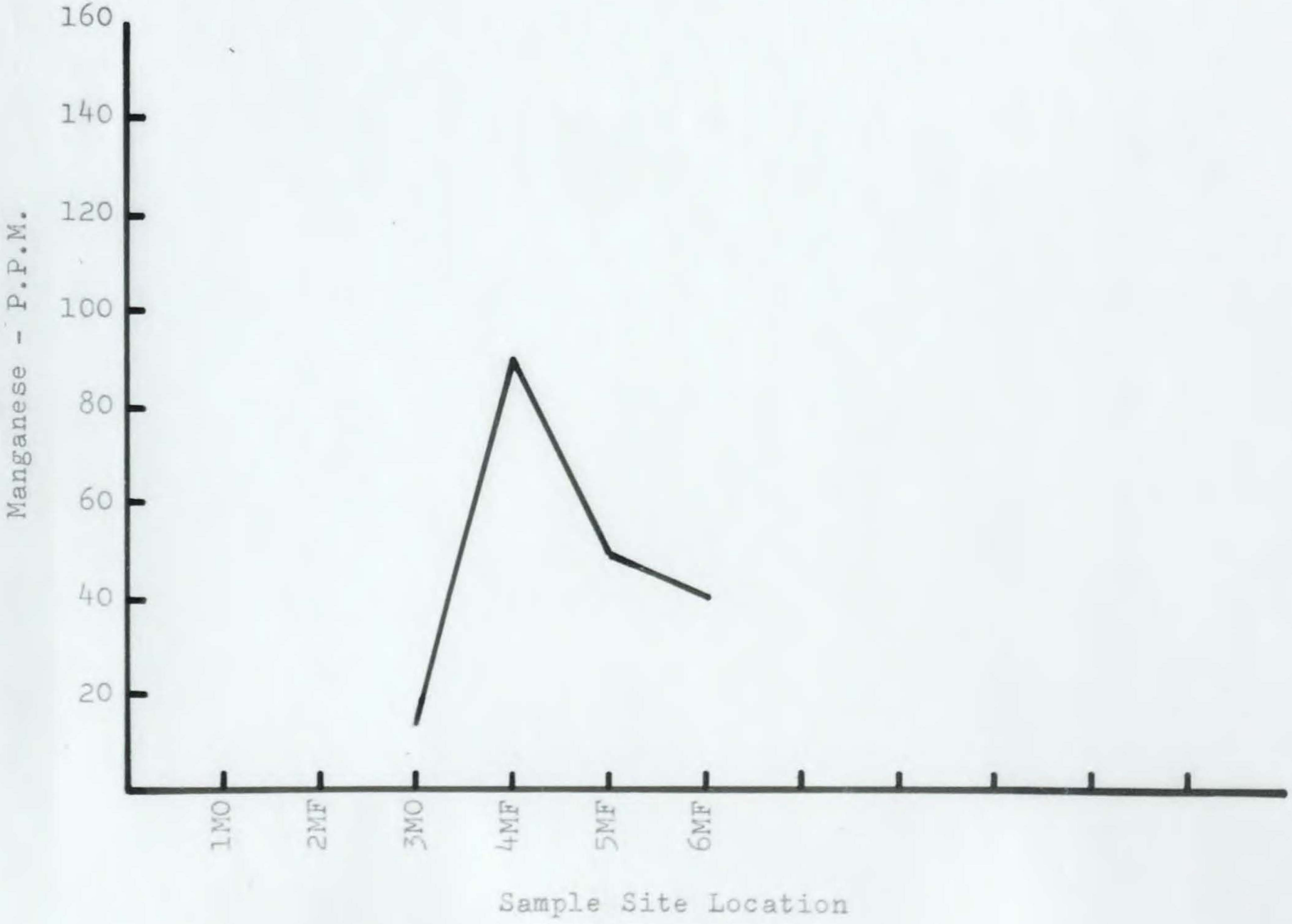
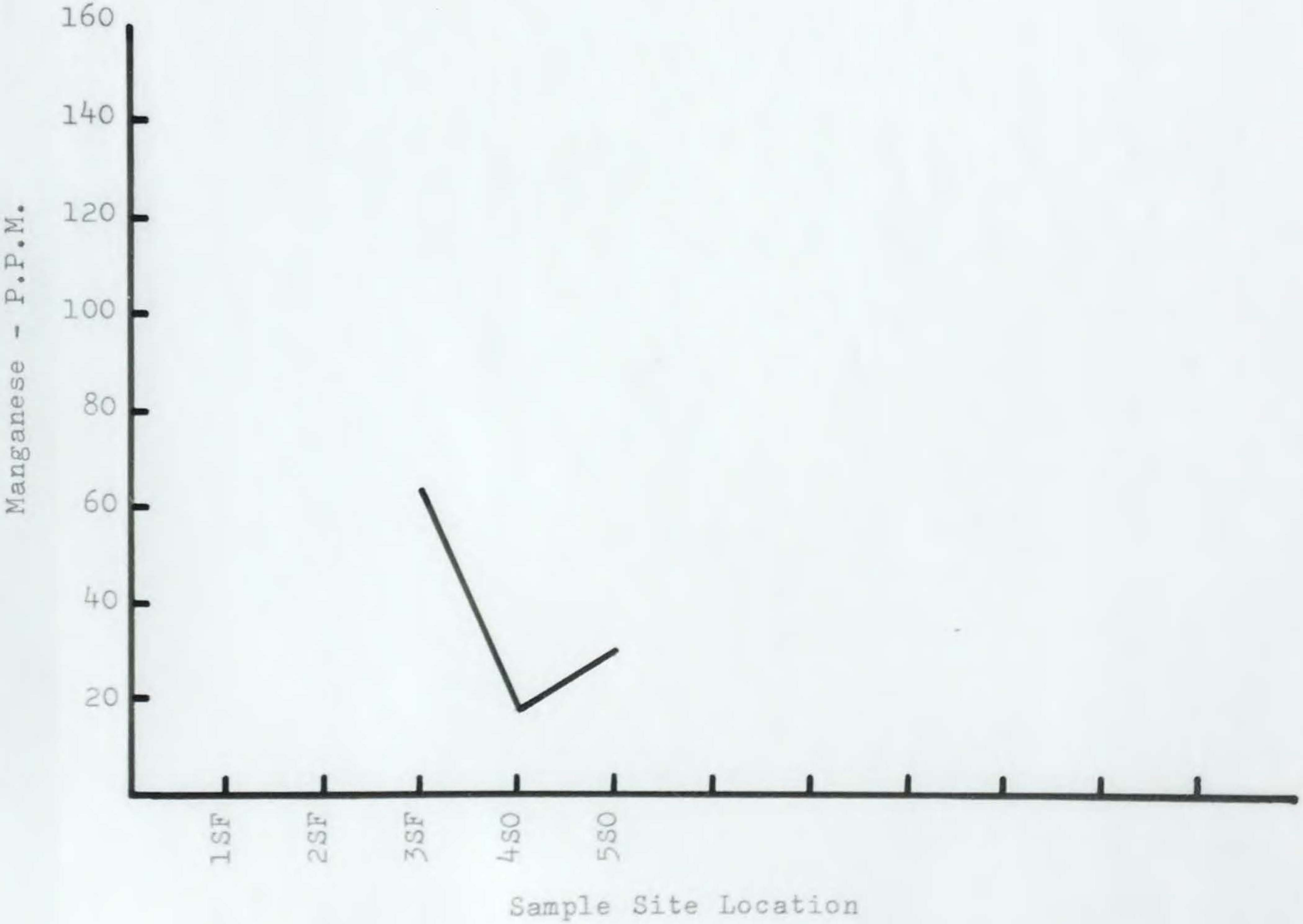
Middle Fork, Workman Creek



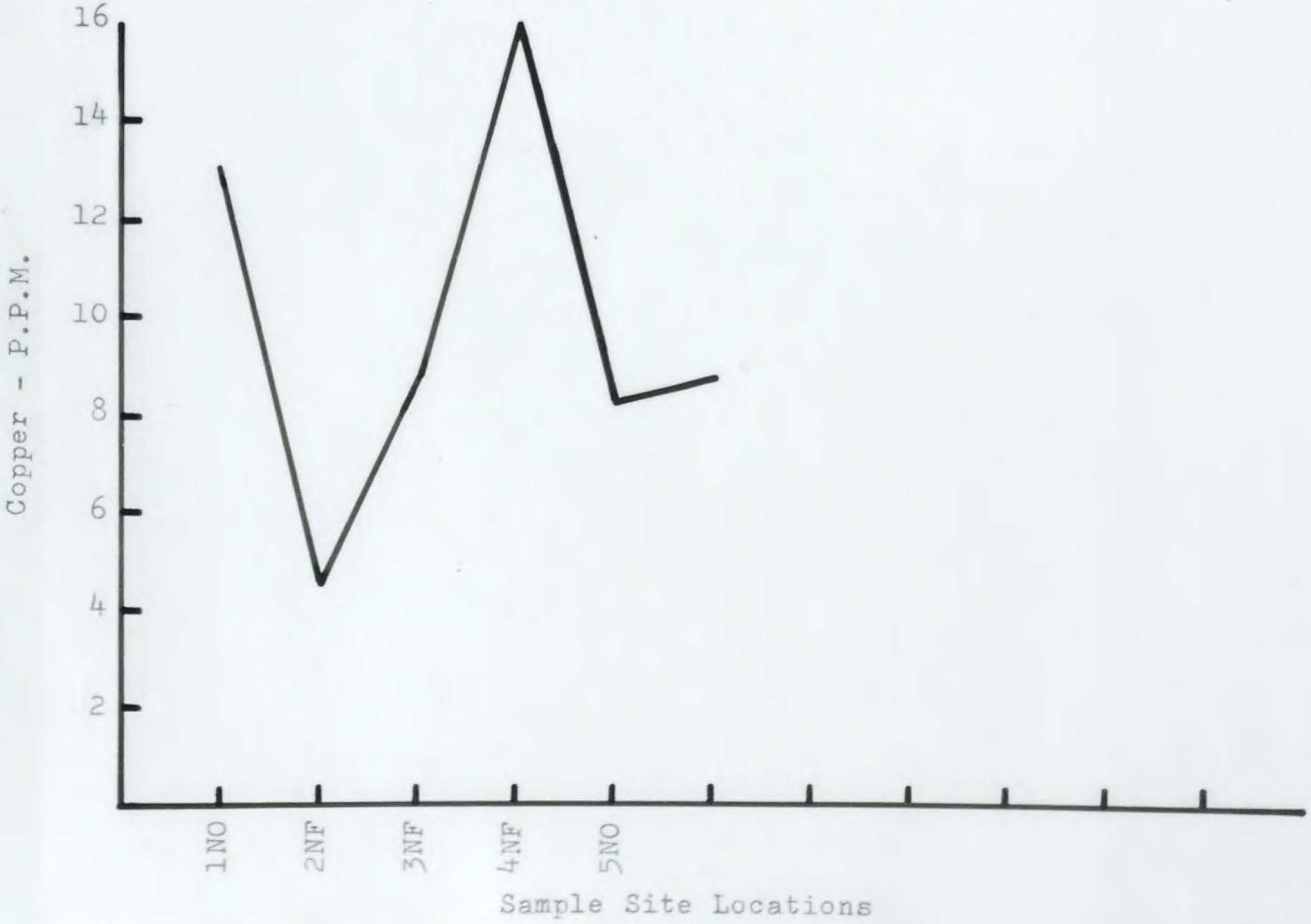
CONCENTRATION OF MANGANESE IN BRACKEN FERN

South Fork, Workman Creek



CONCENTRATION OF COPPER IN NEW MEXICAN LOCUST

North Fork, Workman Creek



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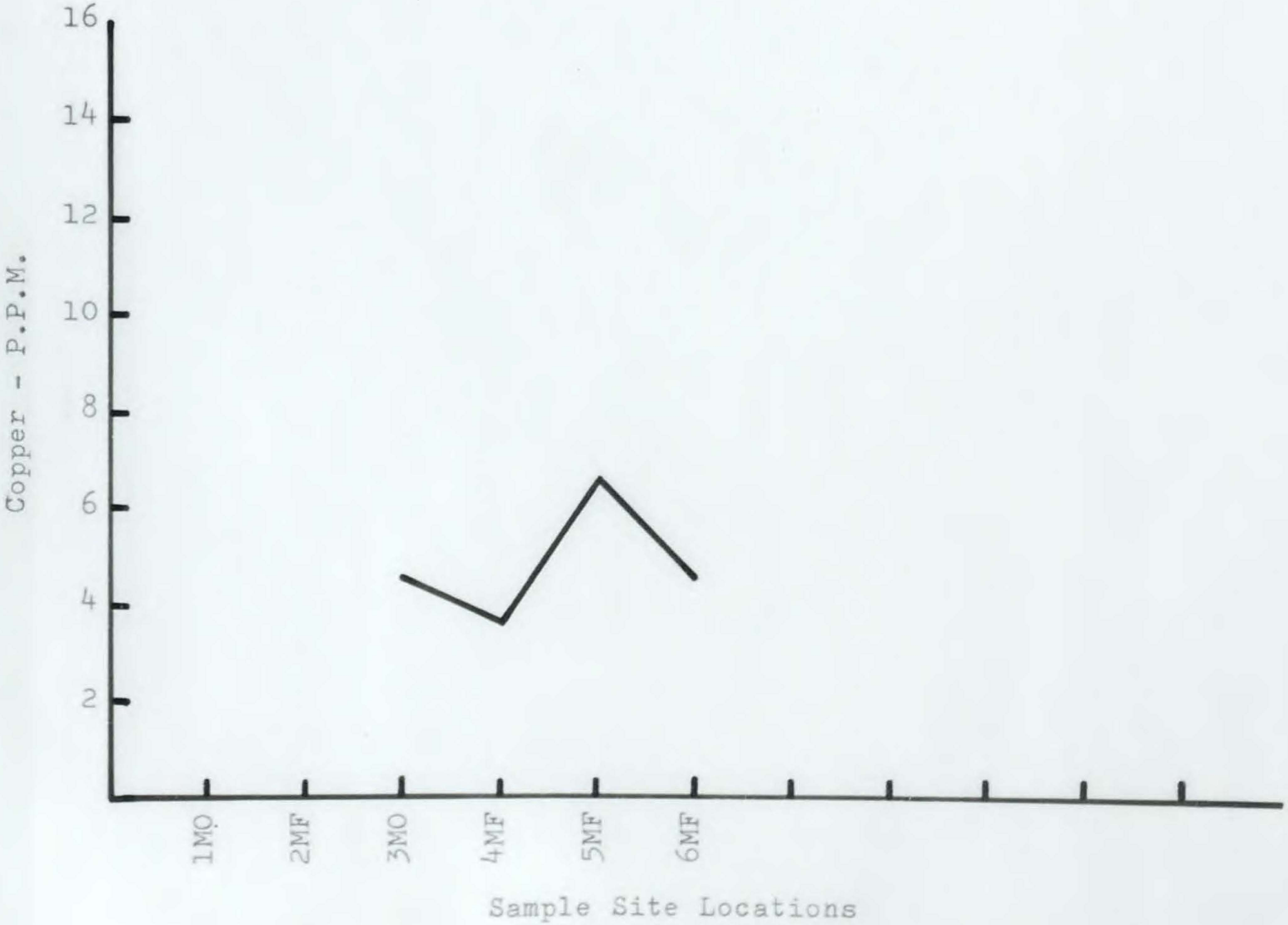
CONCENTRATION OF COPPER IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



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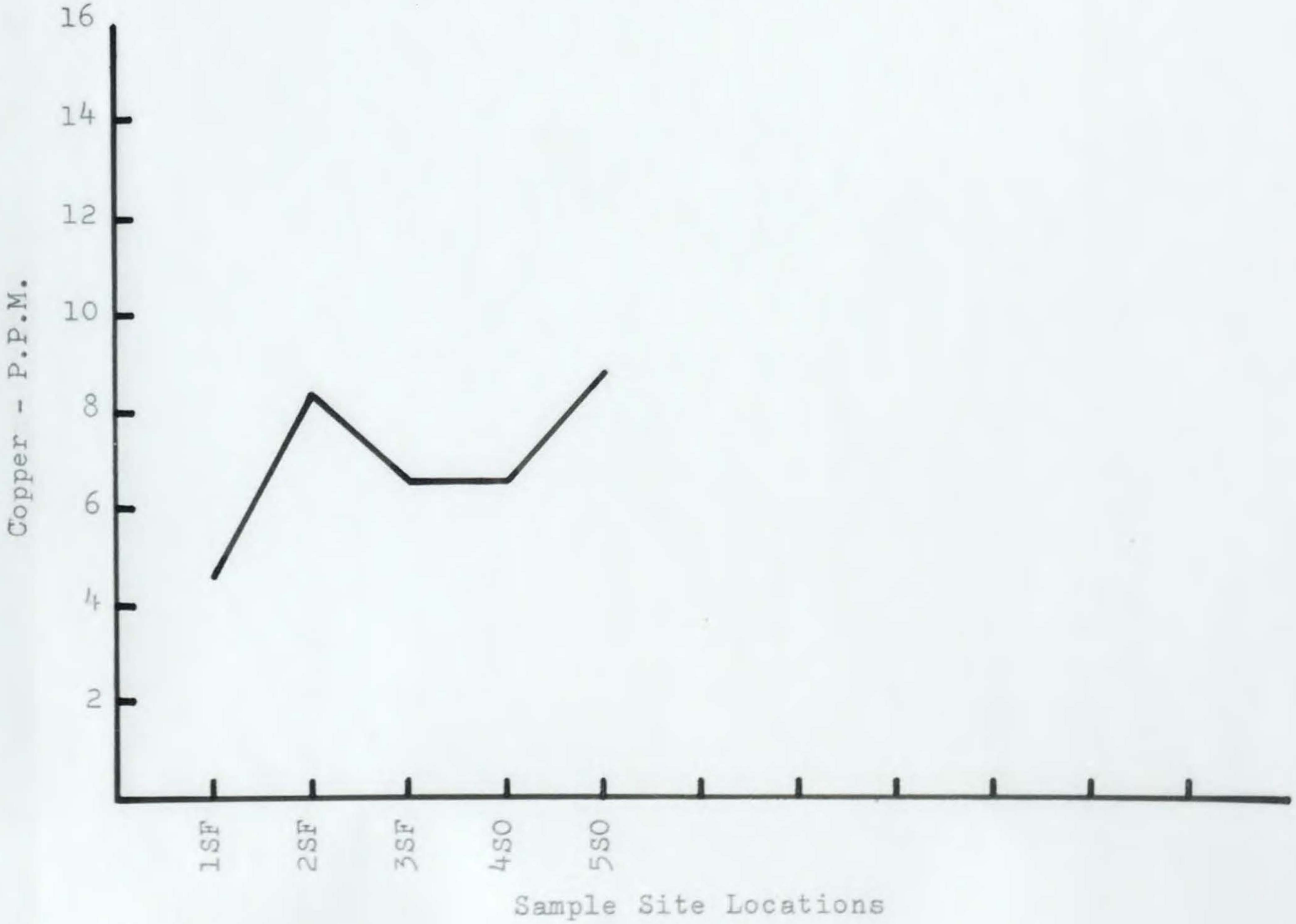
South Fork, Workman Creek



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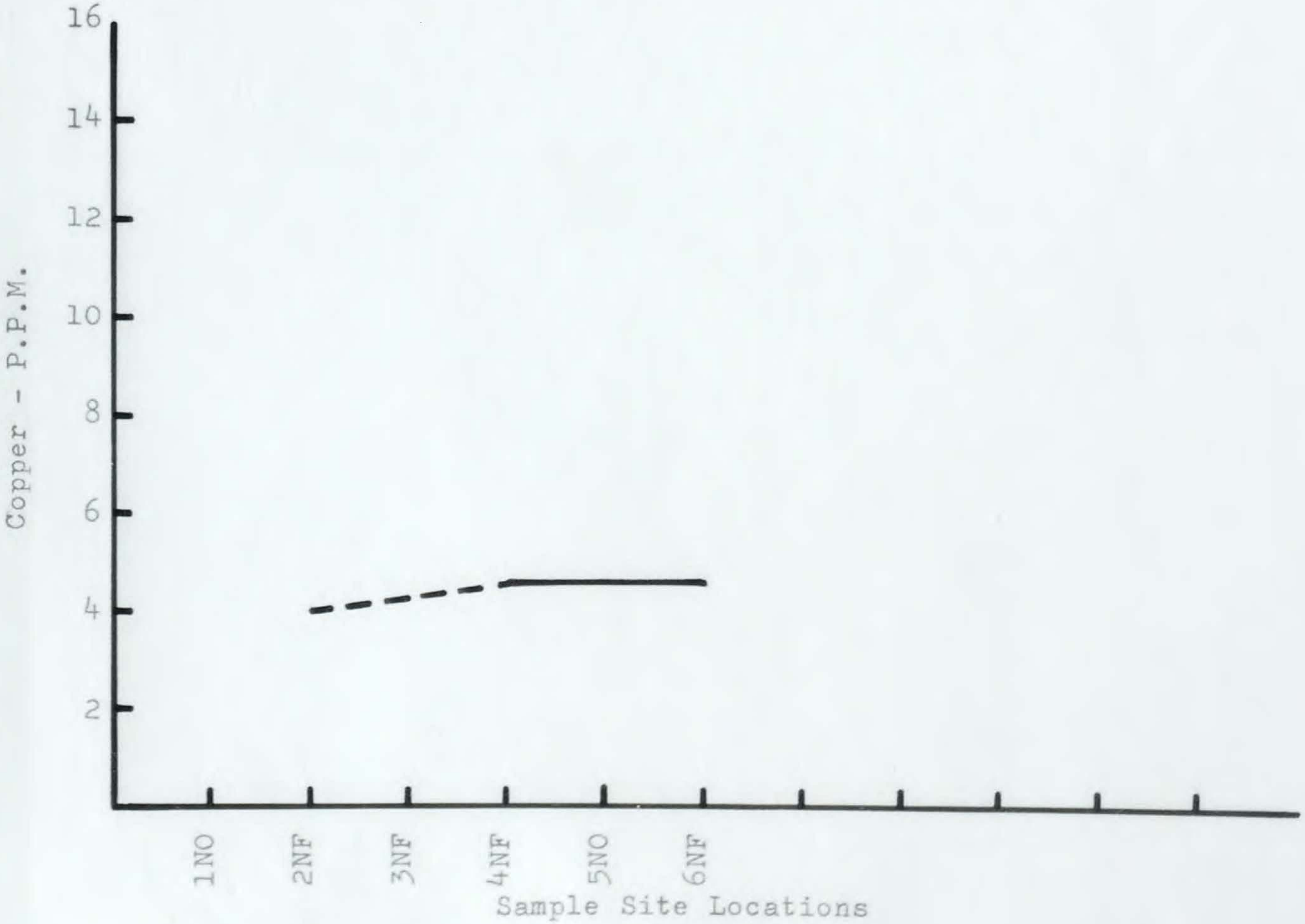
North Fork, Workman Creek



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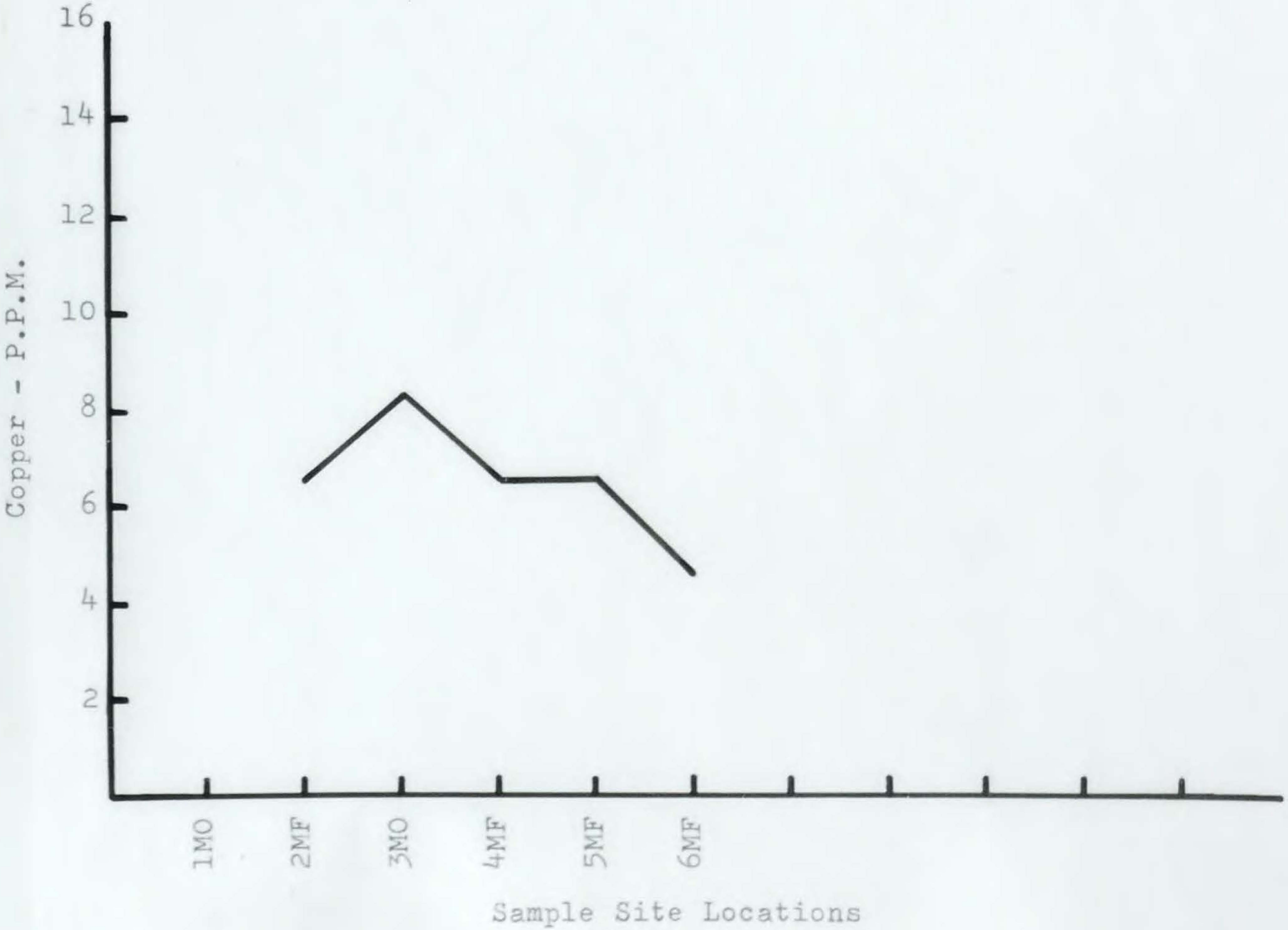
Middle Fork, Workman Creek



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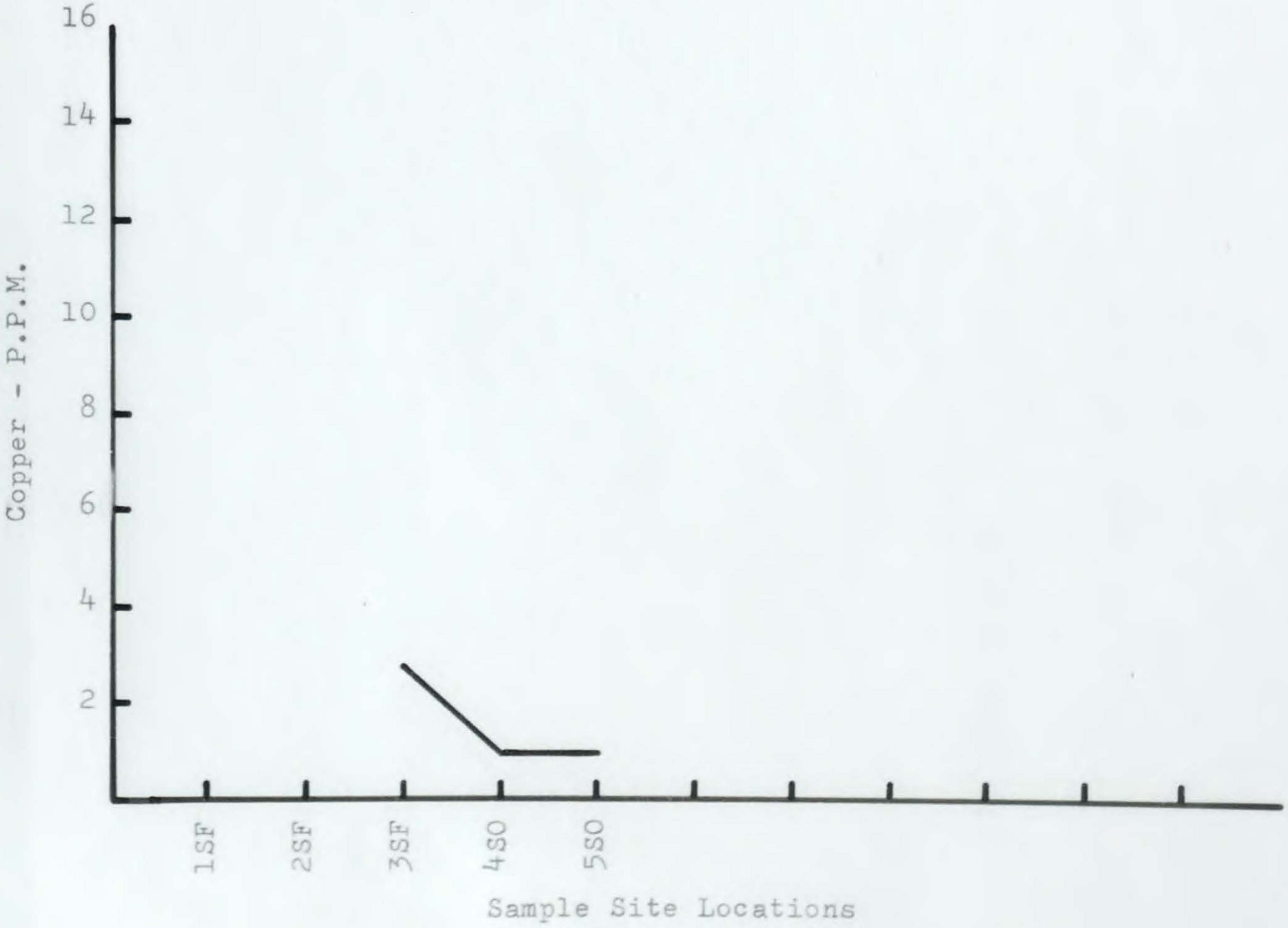
South Fork, Workman Creek



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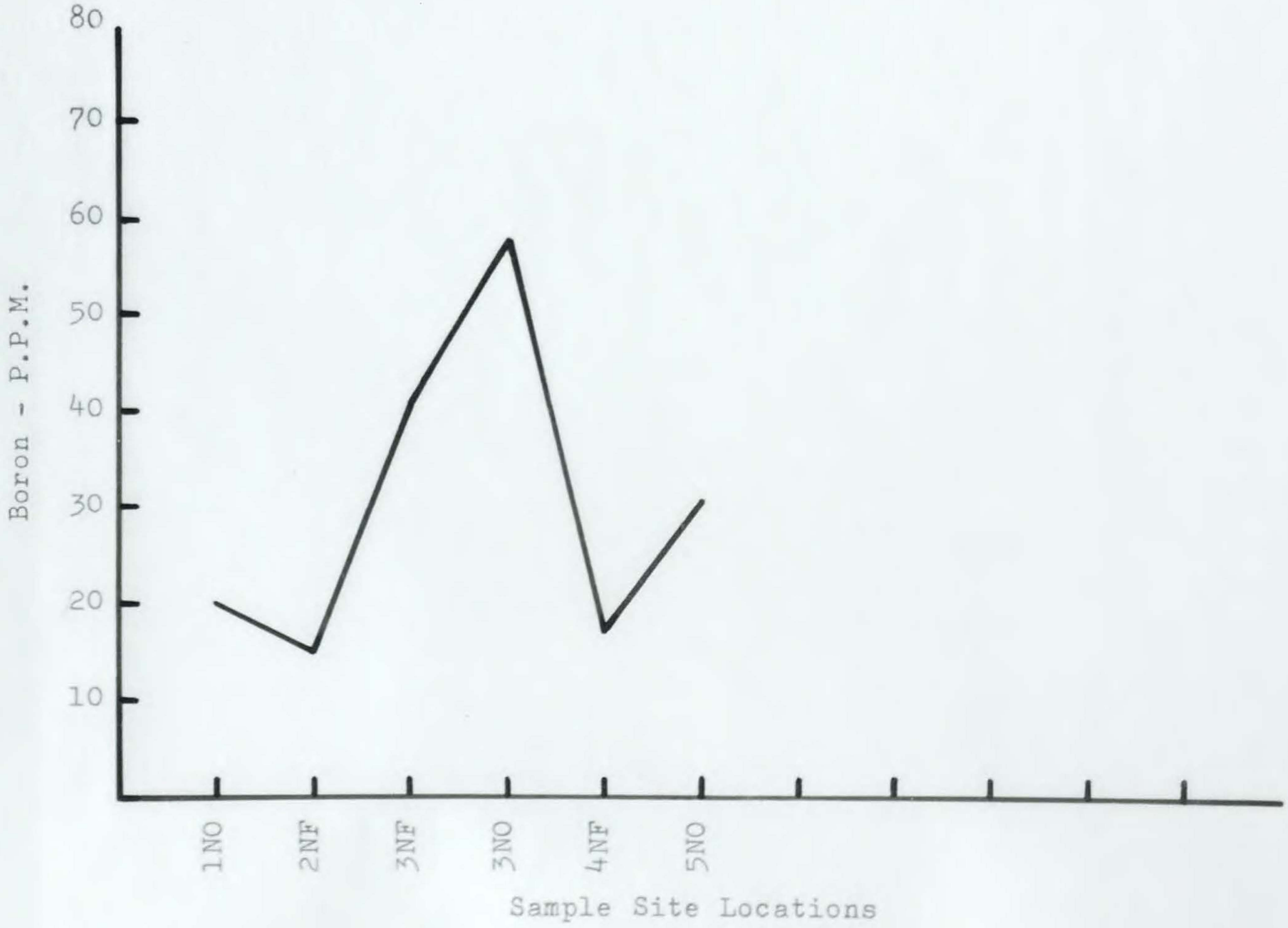
North Fork, Workman Creek



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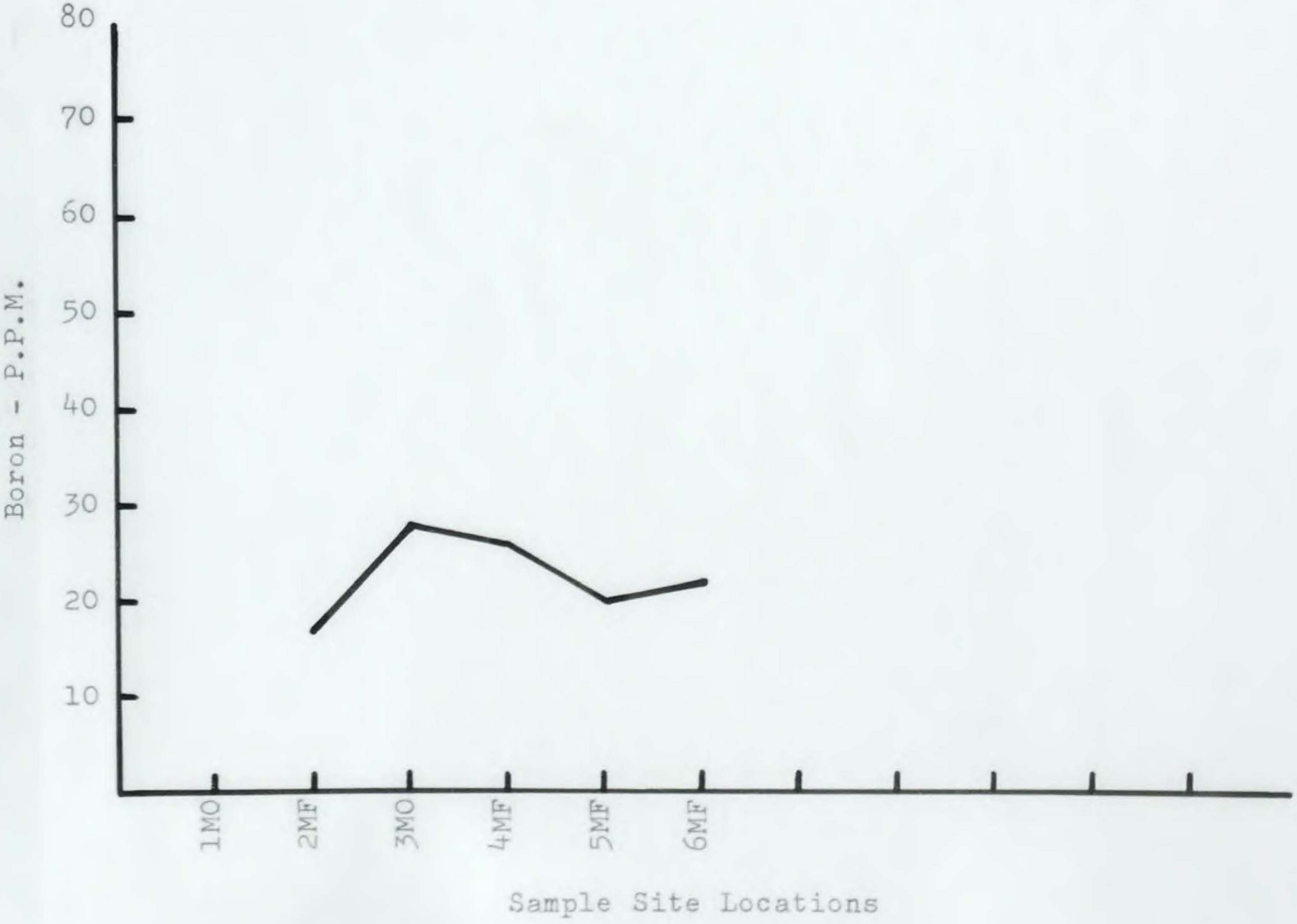
Middle Fork, Workman Creek



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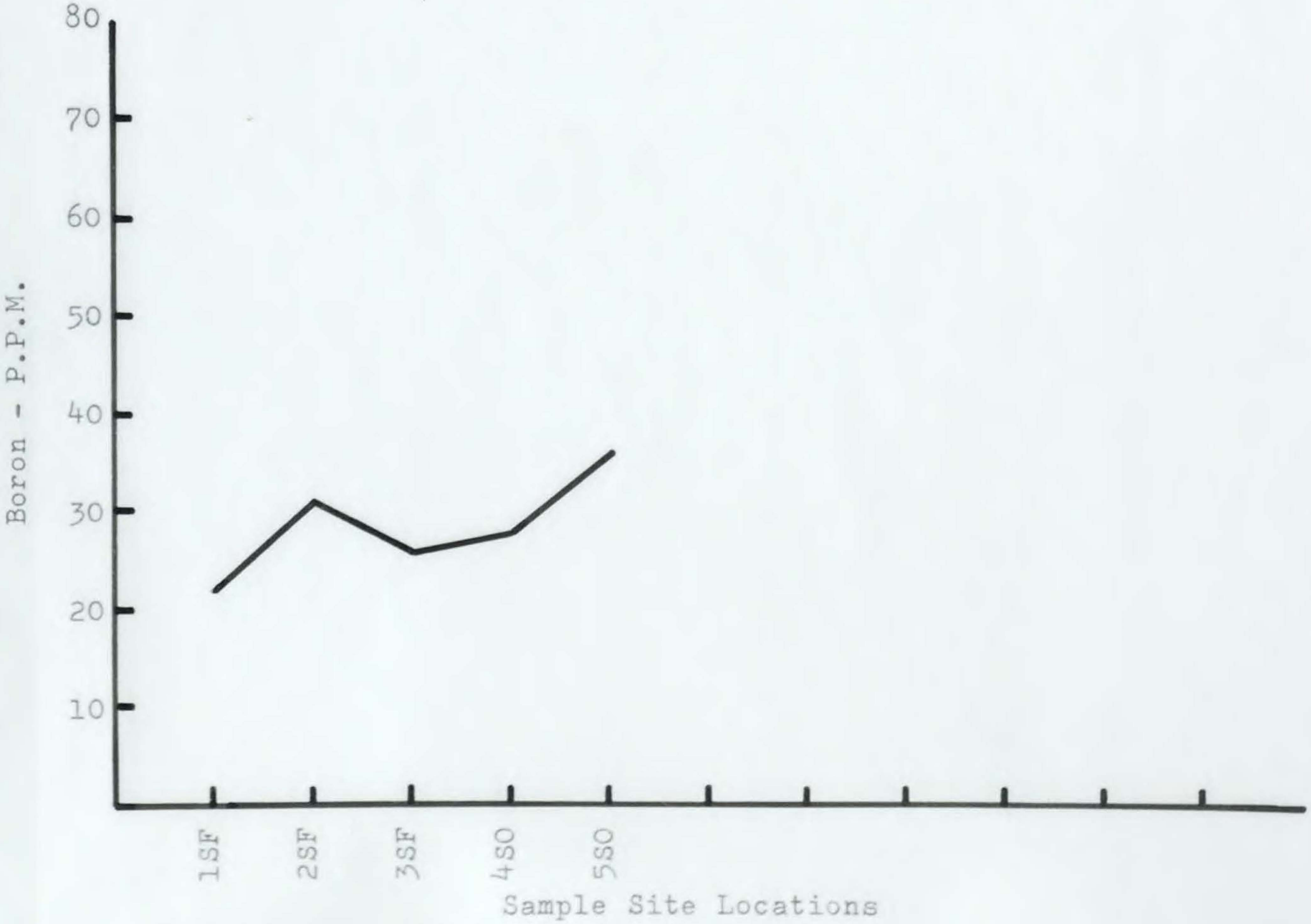
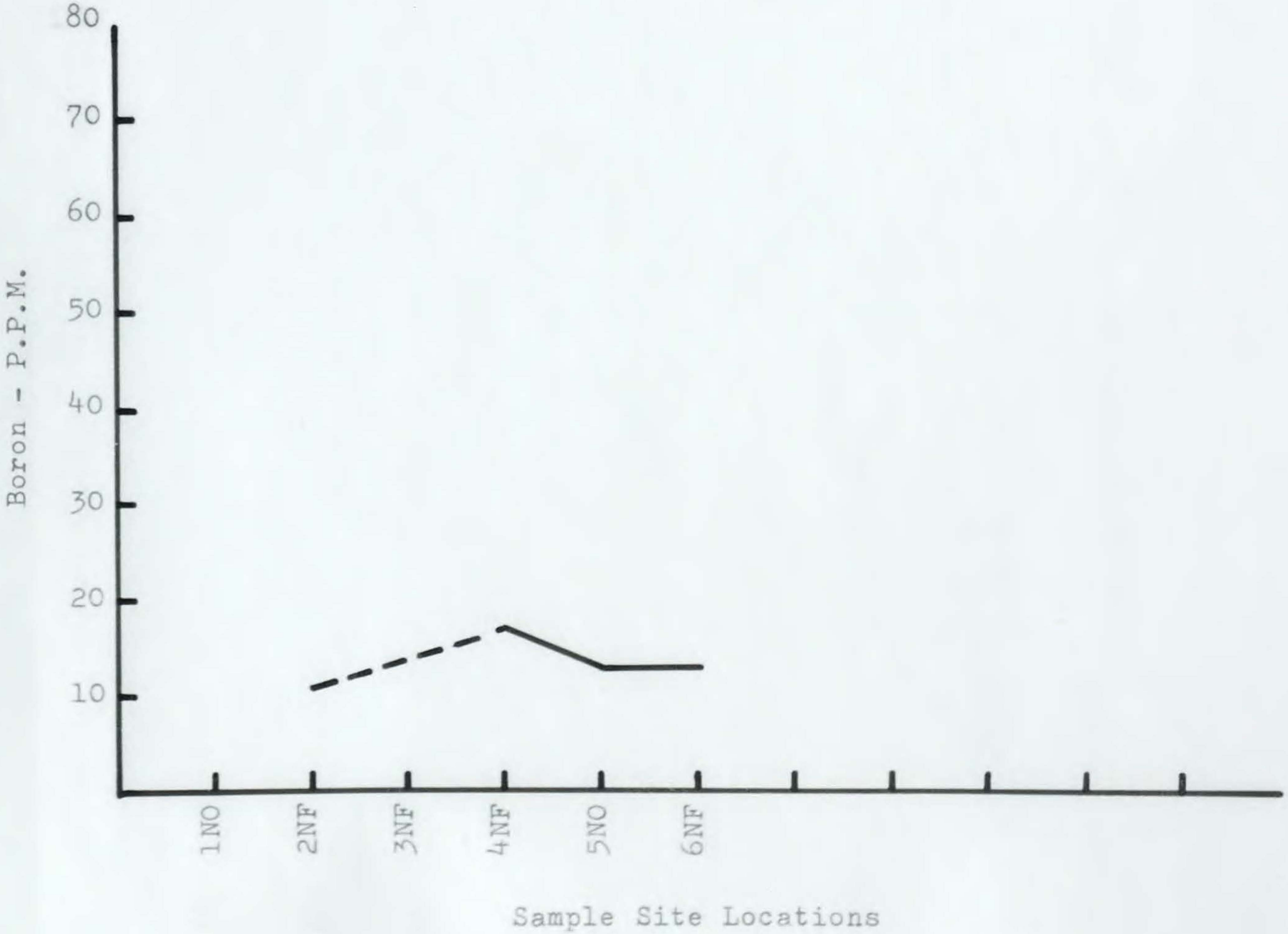
South Fork, Workman Creek



CONCENTRATION OF BORON IN BRACKEN FERN

North Fork, Workman Creek



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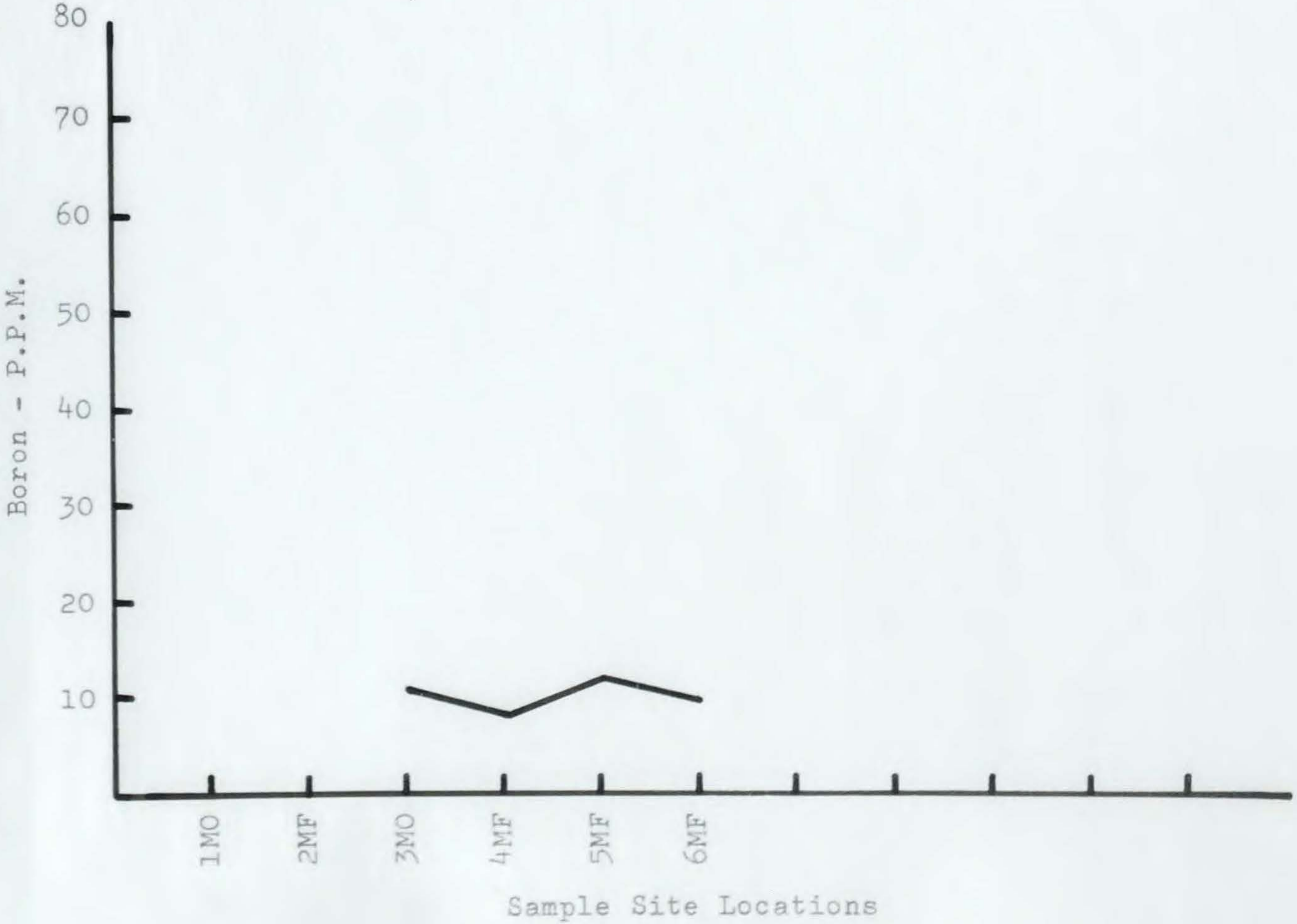
Middle Fork, Workman Creek



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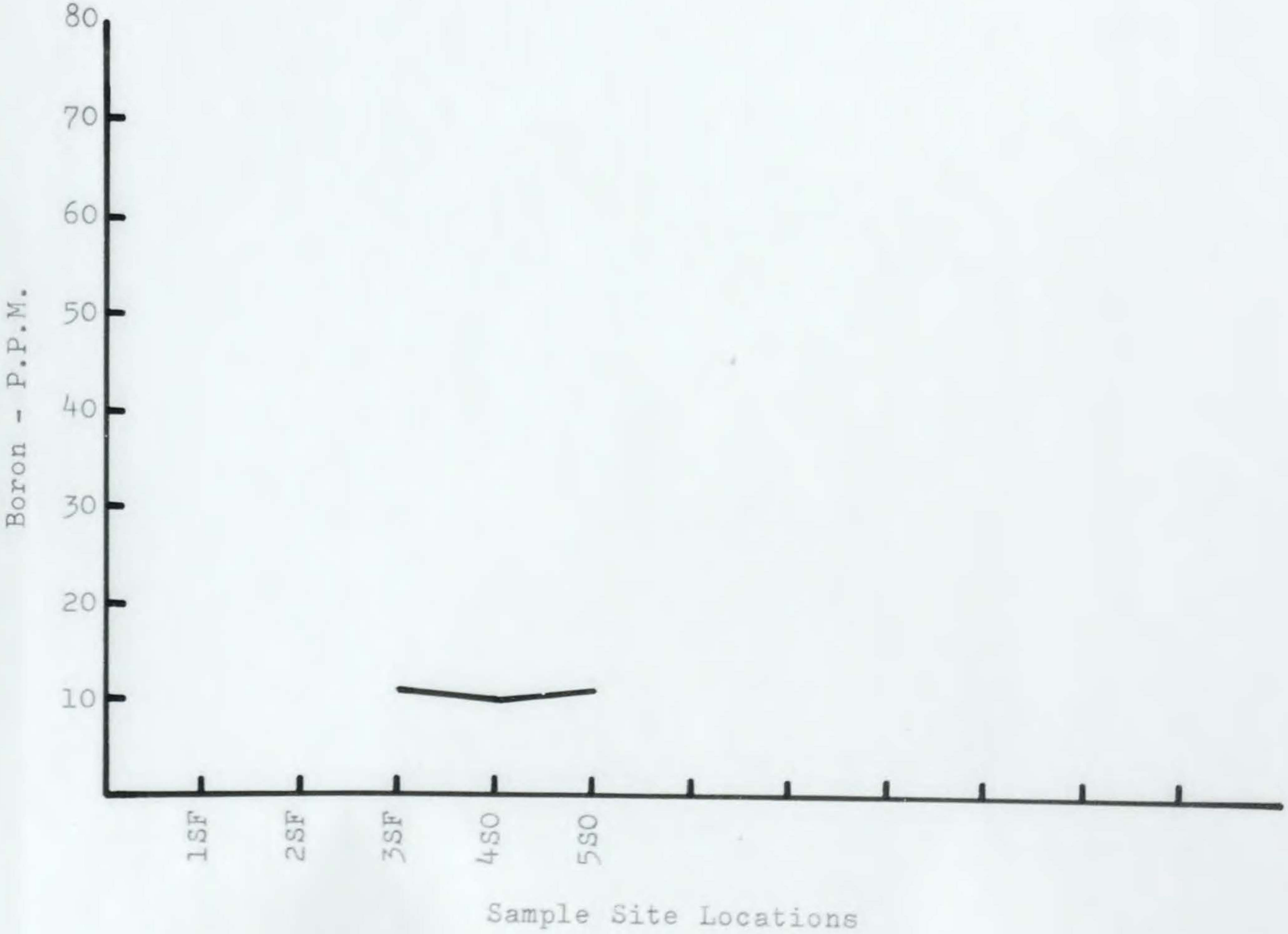
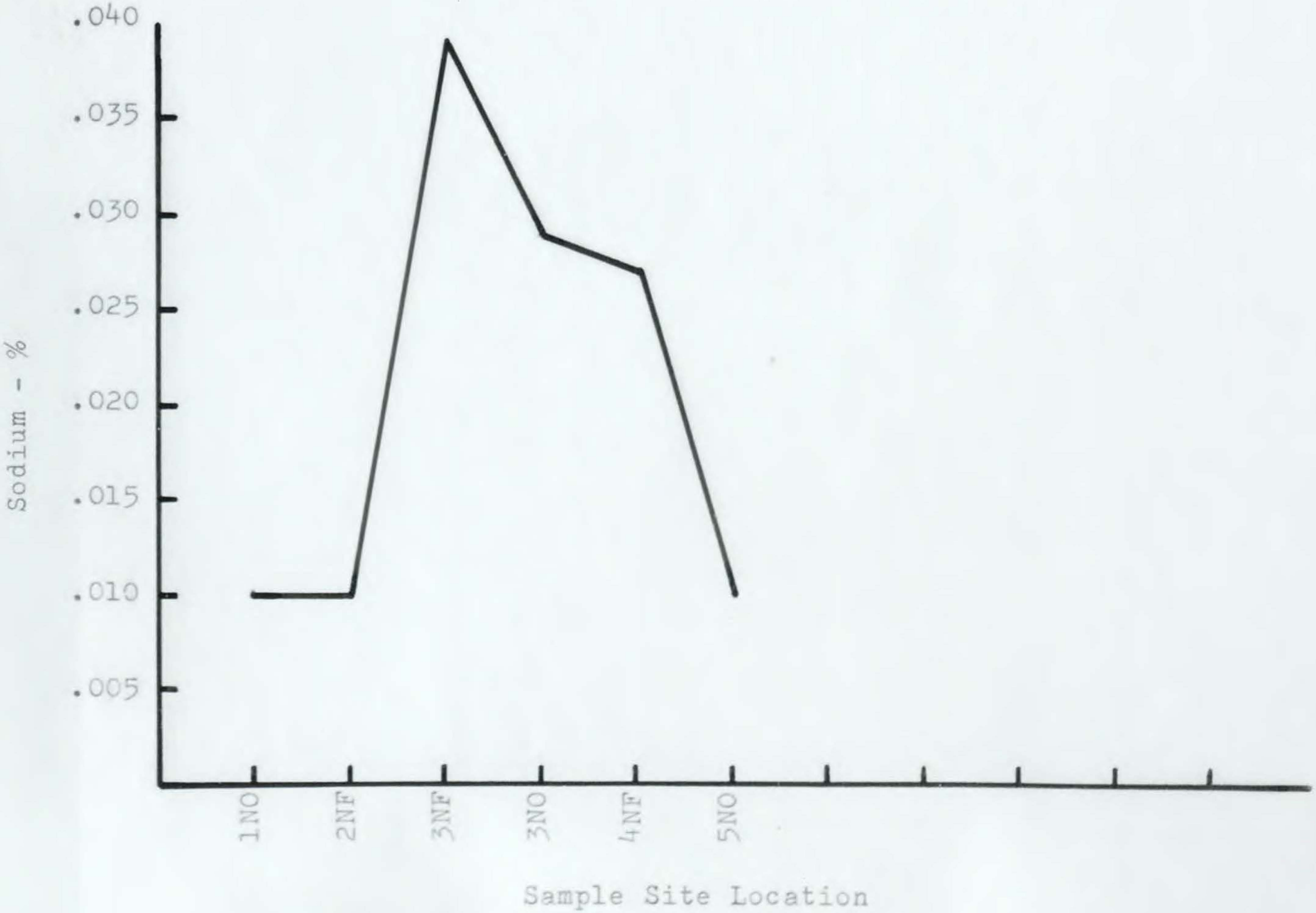
South Fork, Workman Creek



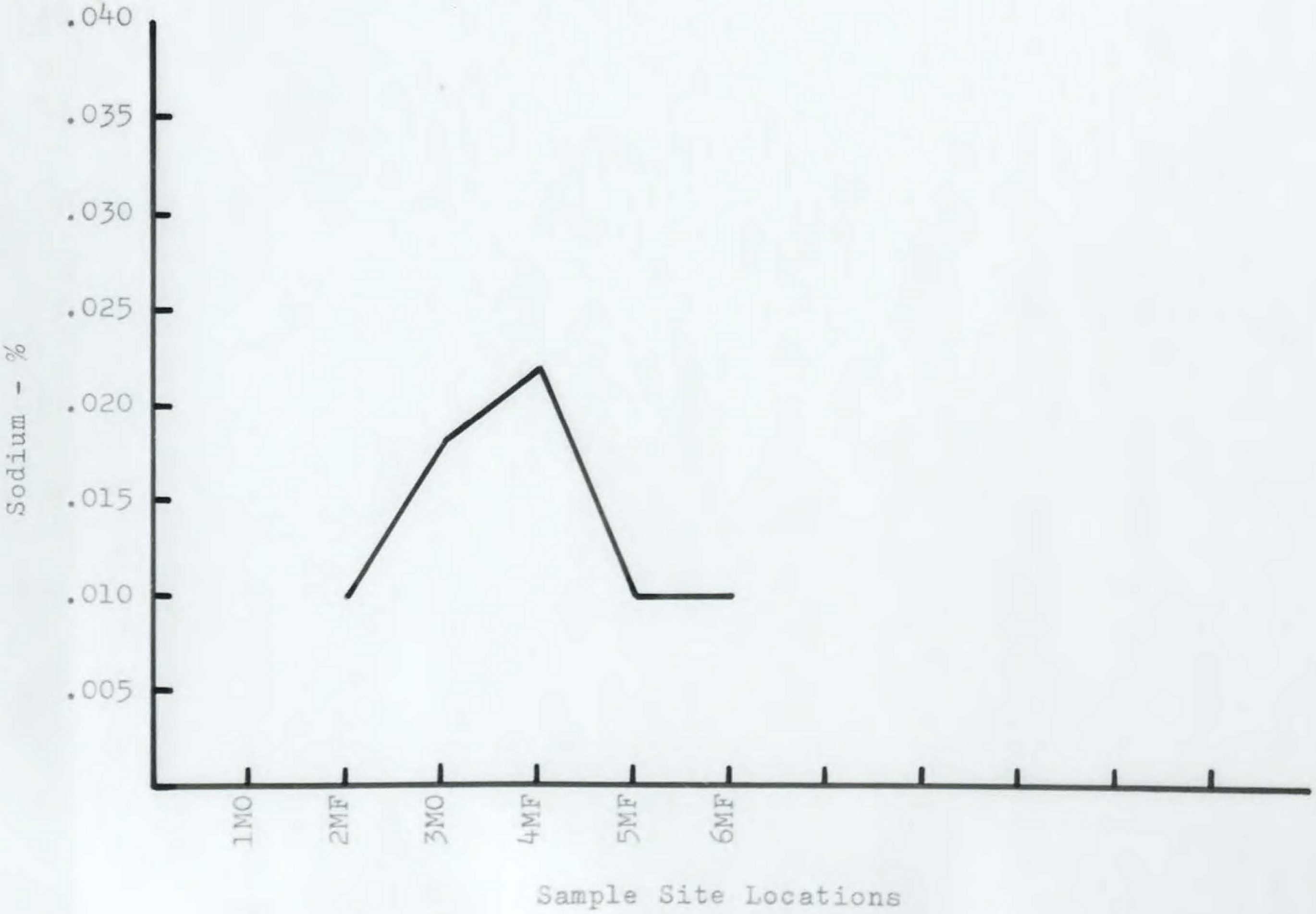
CONCENTRATION OF SODIUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



CONCENTRATION OF SODIUM IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



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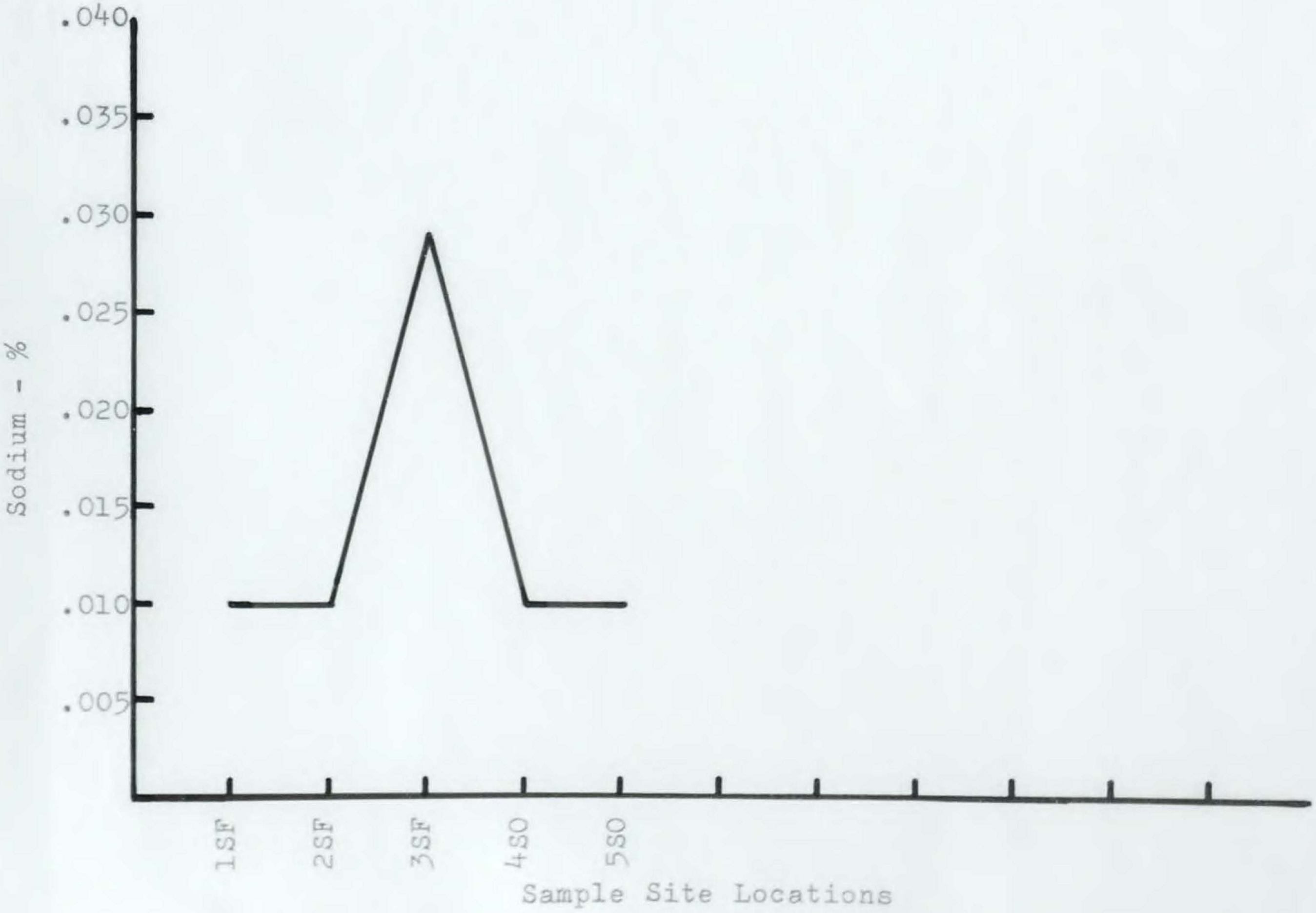
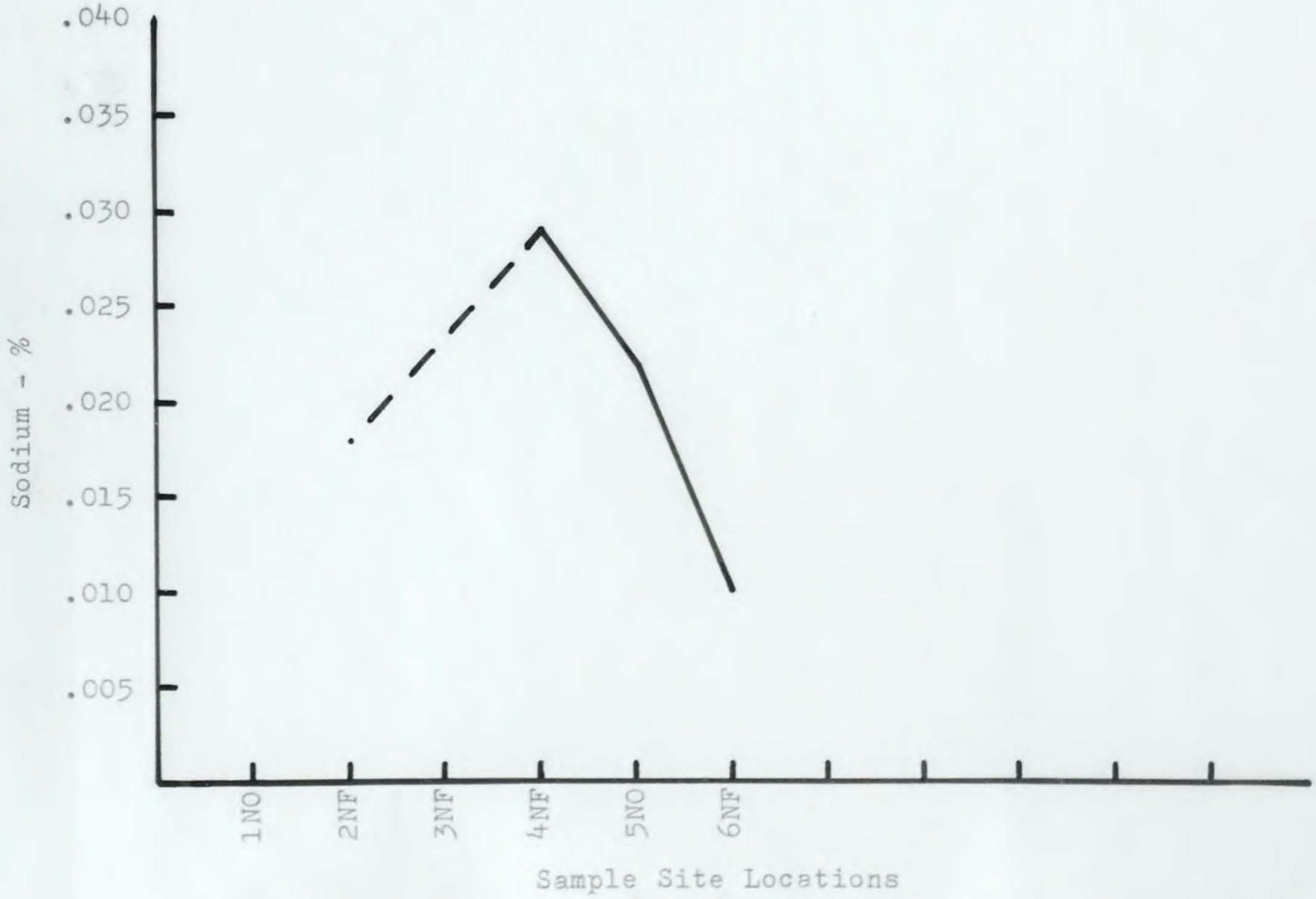
South Fork, Workman Creek



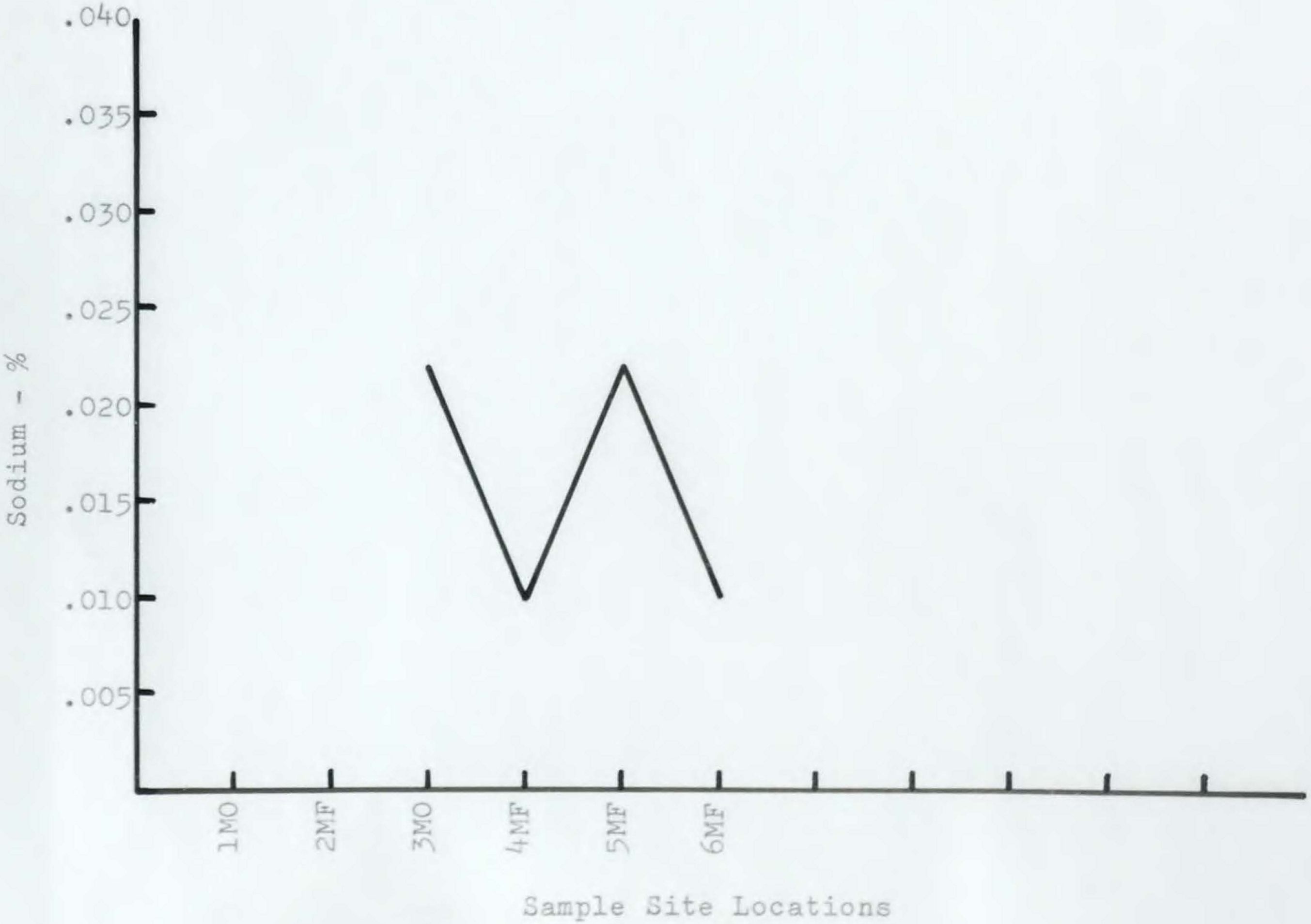
CONCENTRATION OF SODIUM IN BRACKEN FERN

North Fork, Workman Creek



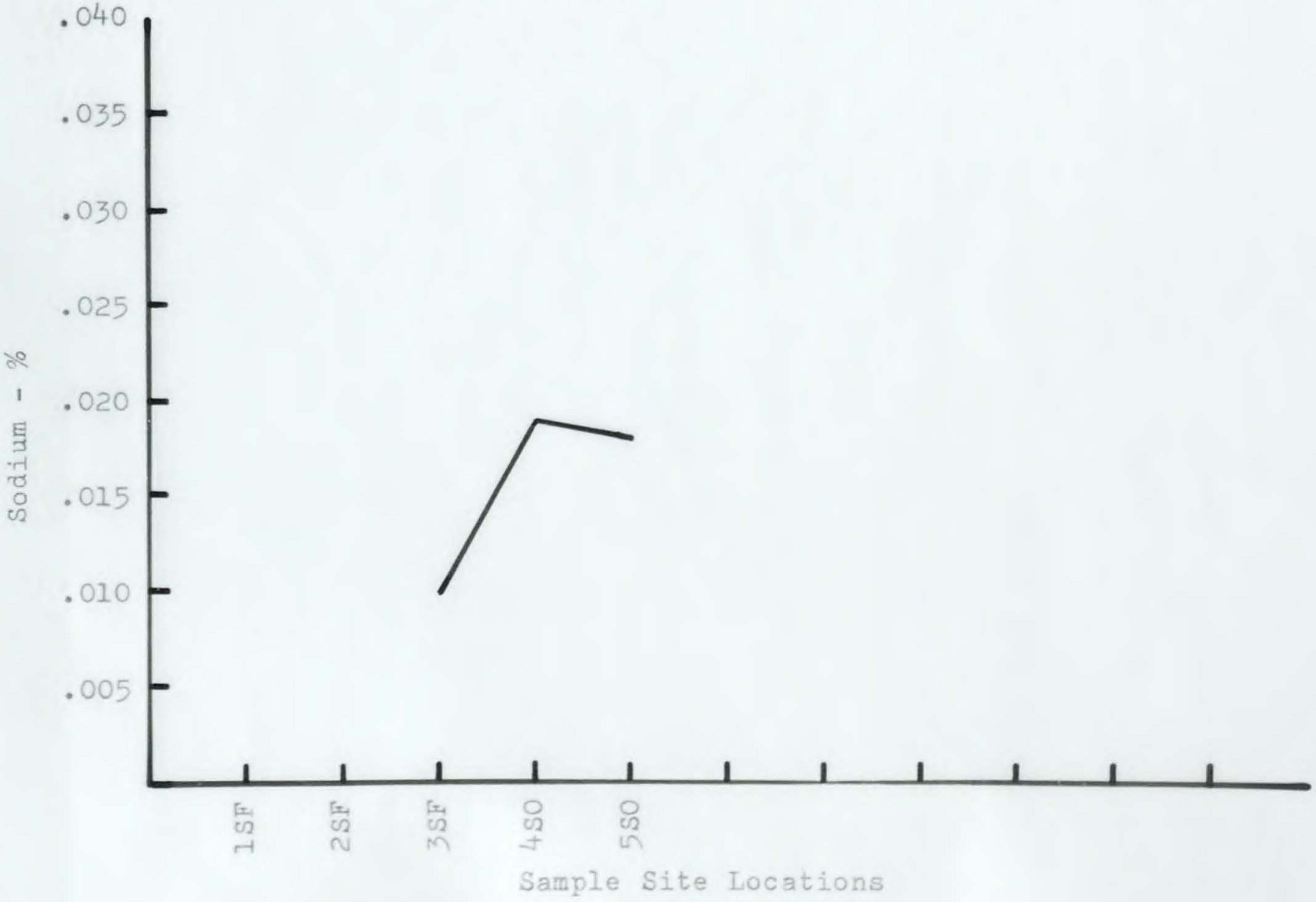
CONCENTRATION OF SODIUM IN BRACKEN FERN

Middle Fork, Workman Creek



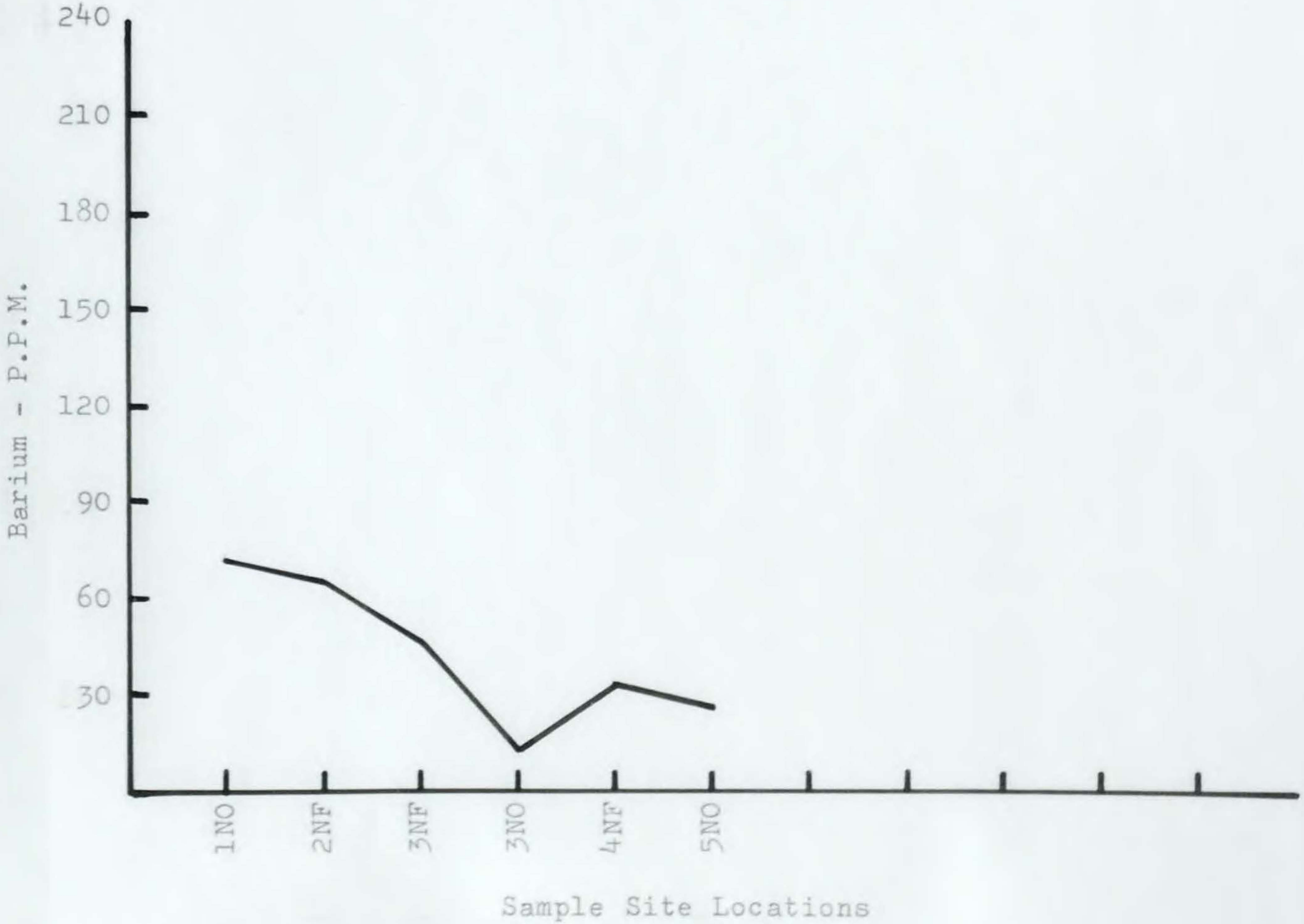
CONCENTRATION OF SODIUM IN BRACKEN FERN

South Fork, Workman Creek



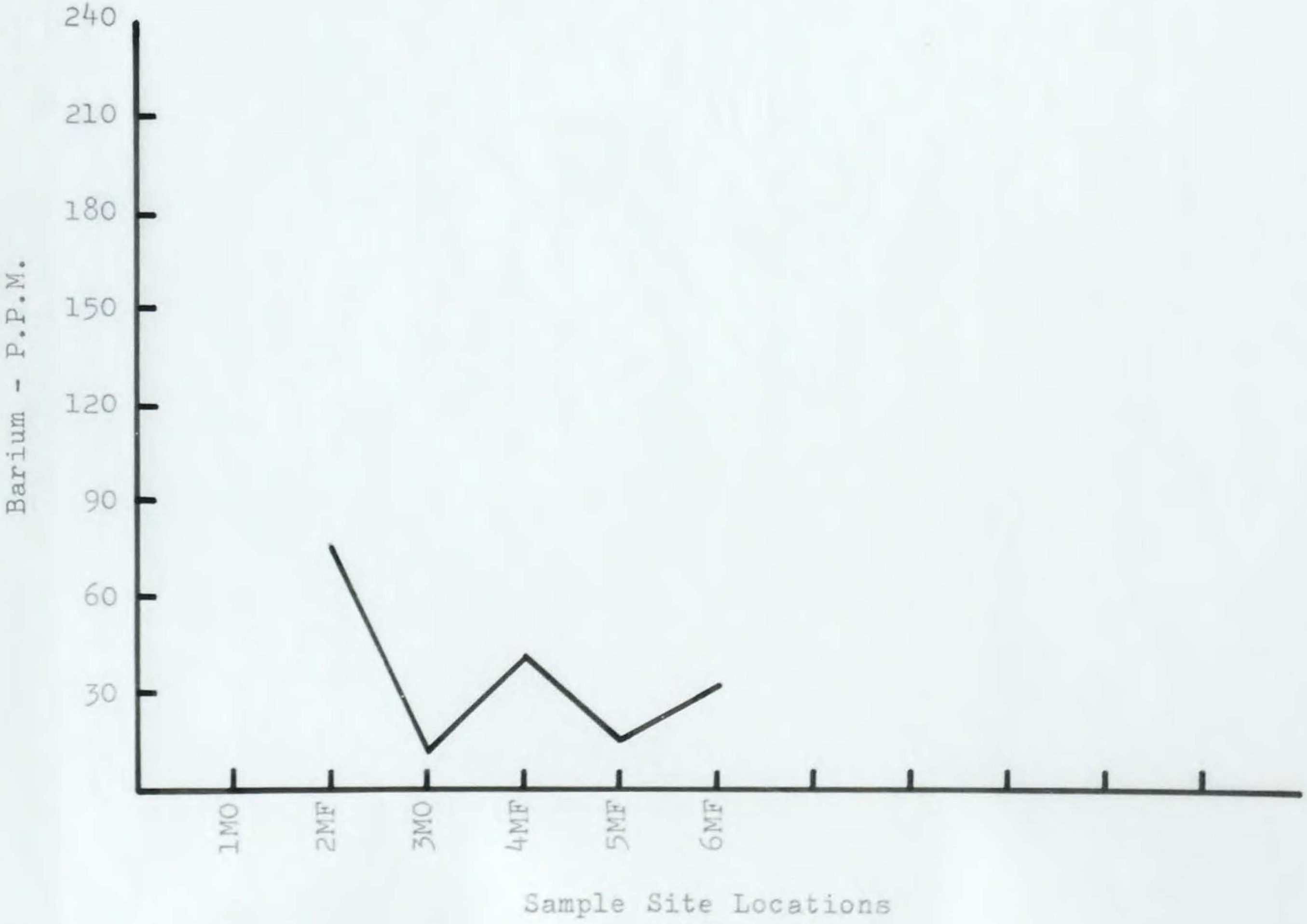
CONCENTRATION OF BARIUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



CONCENTRATION OF BARIUM IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



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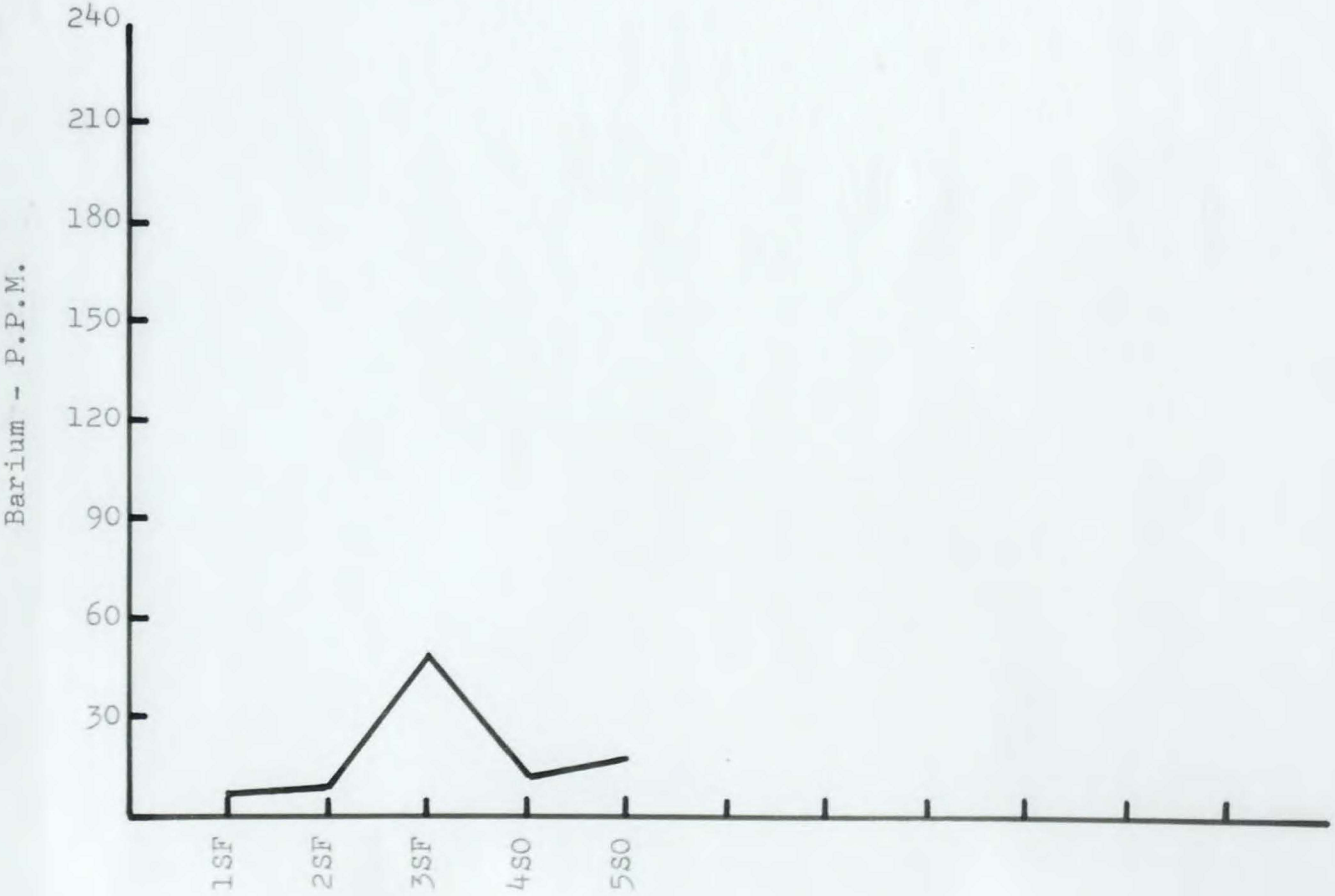
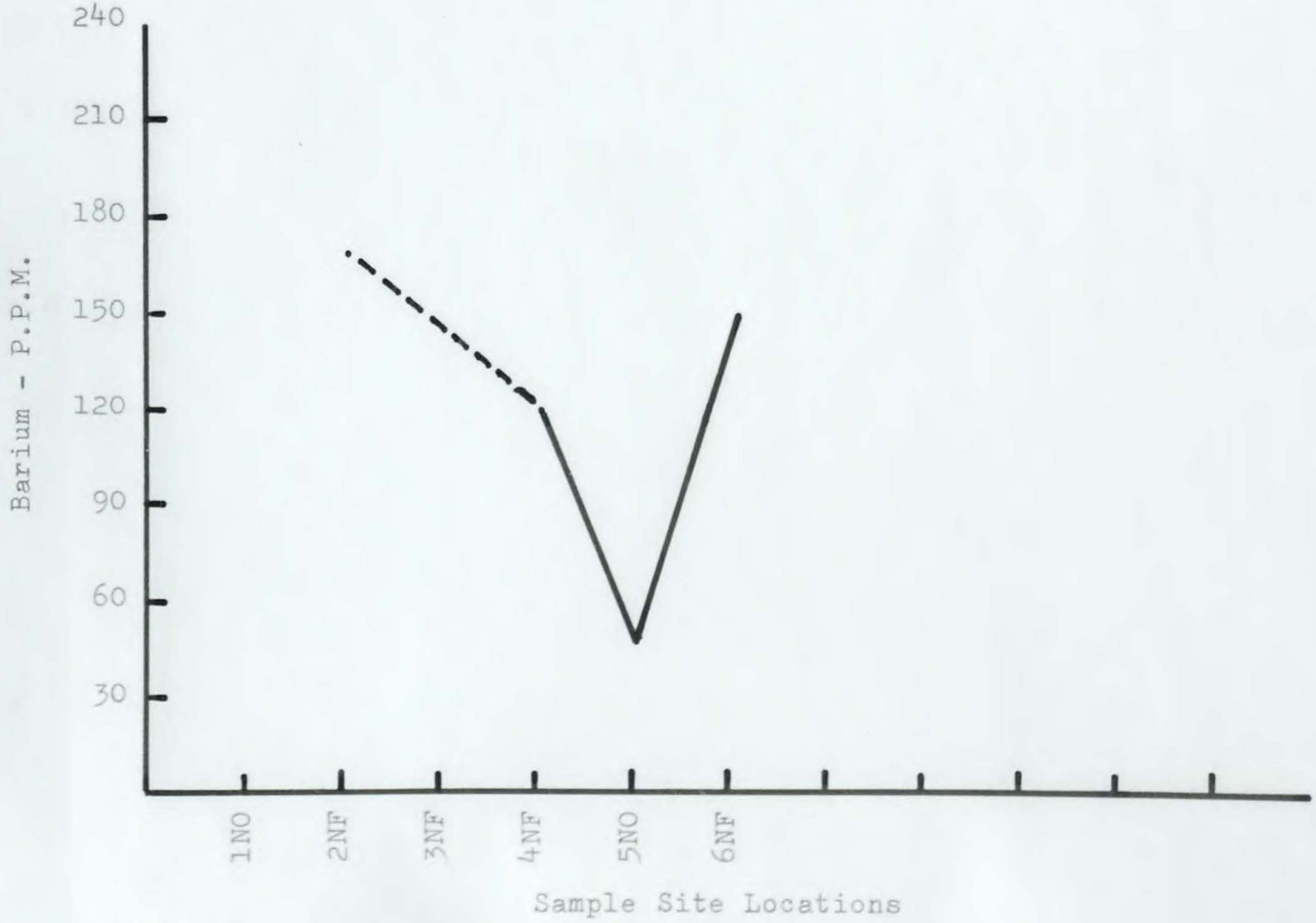
South Fork, Workman Creek



Sample Site Locations

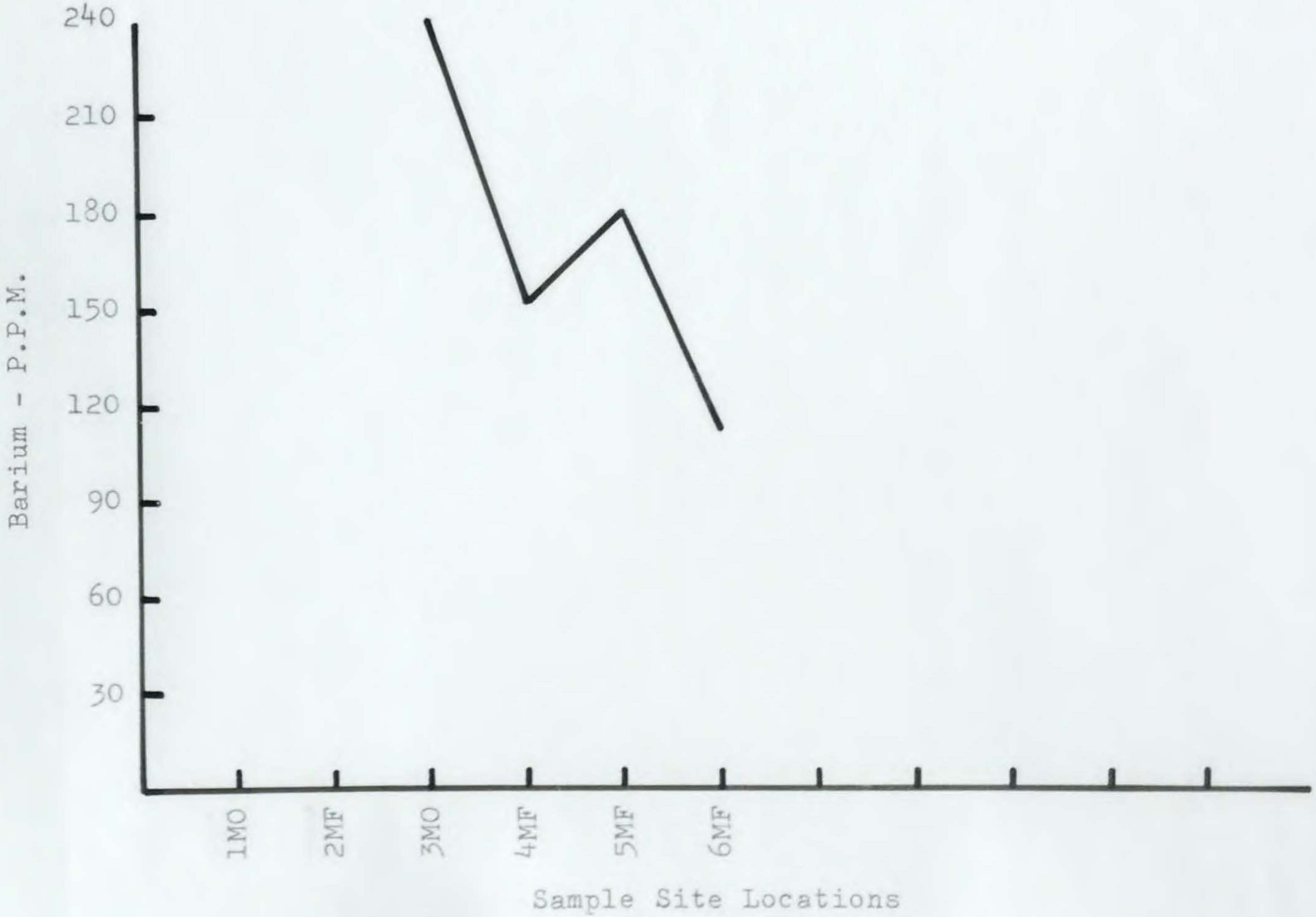
CONCENTRATION OF BARIUM IN BRACKEN FERN

North Fork, Workman Creek



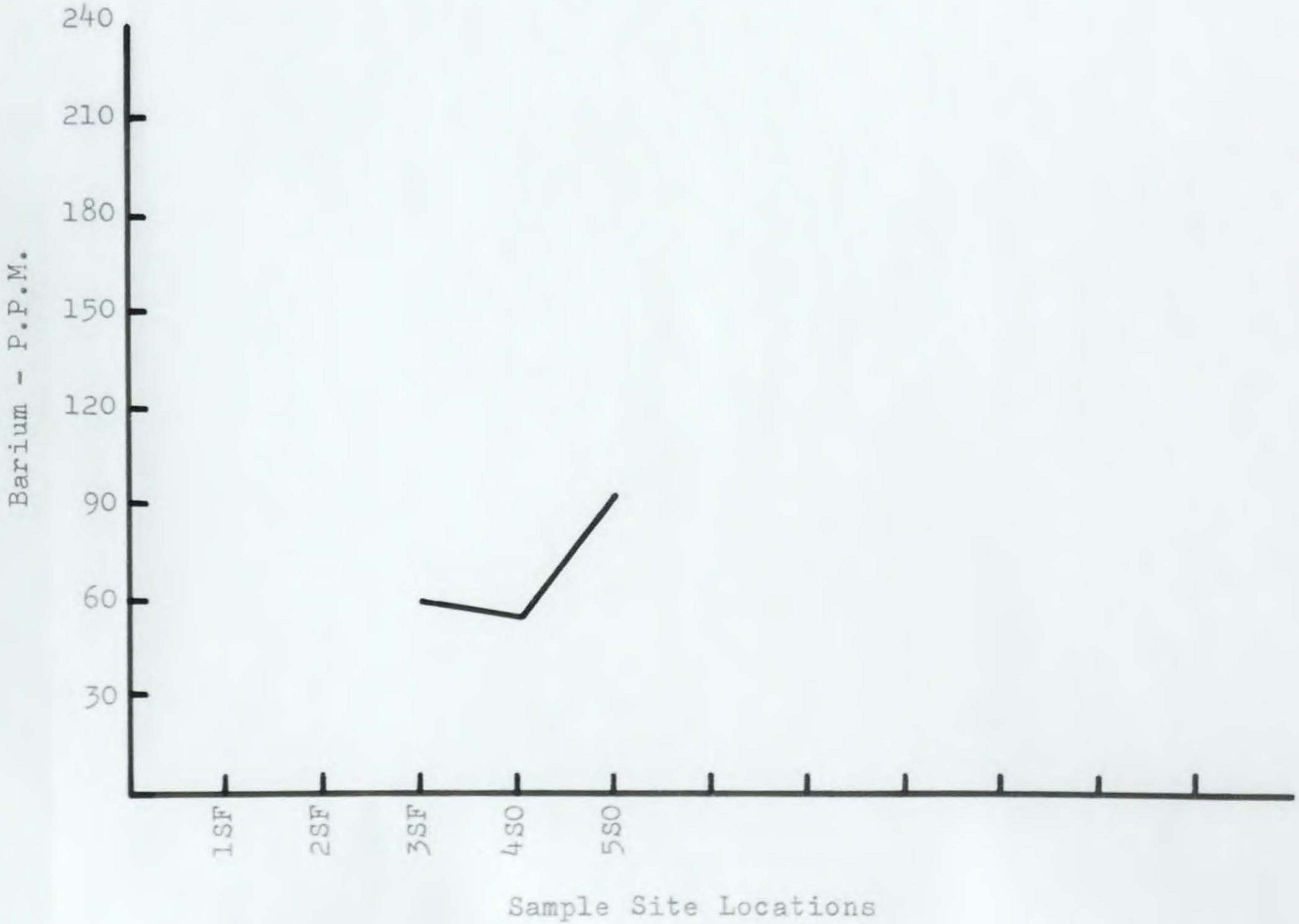
CONCENTRATION OF BARIUM IN BRACKEN FERN

Middle Fork, Workman Creek



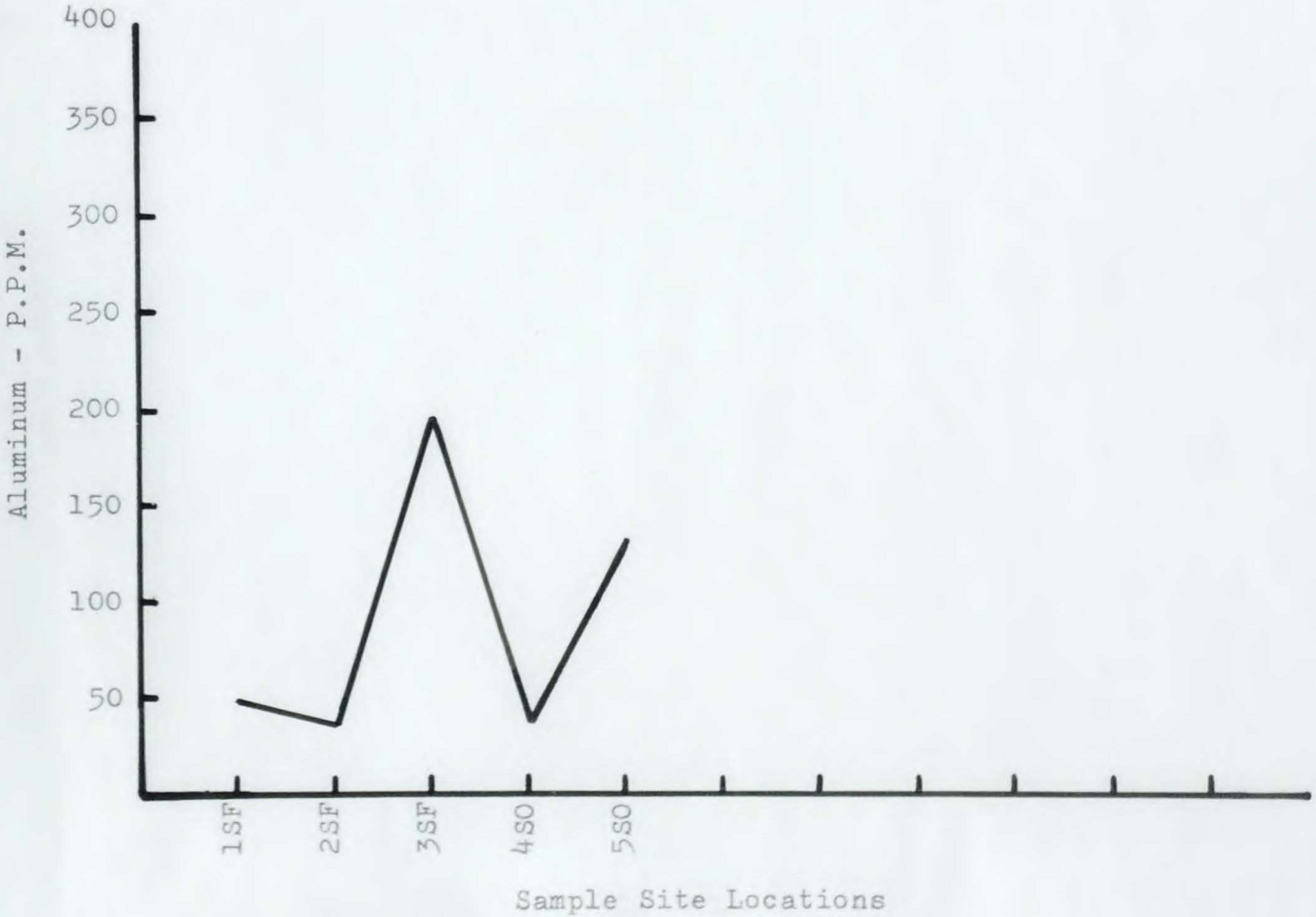
CONCENTRATION OF BARIUM IN BRACKEN FERN

South Fork, Workman Creek



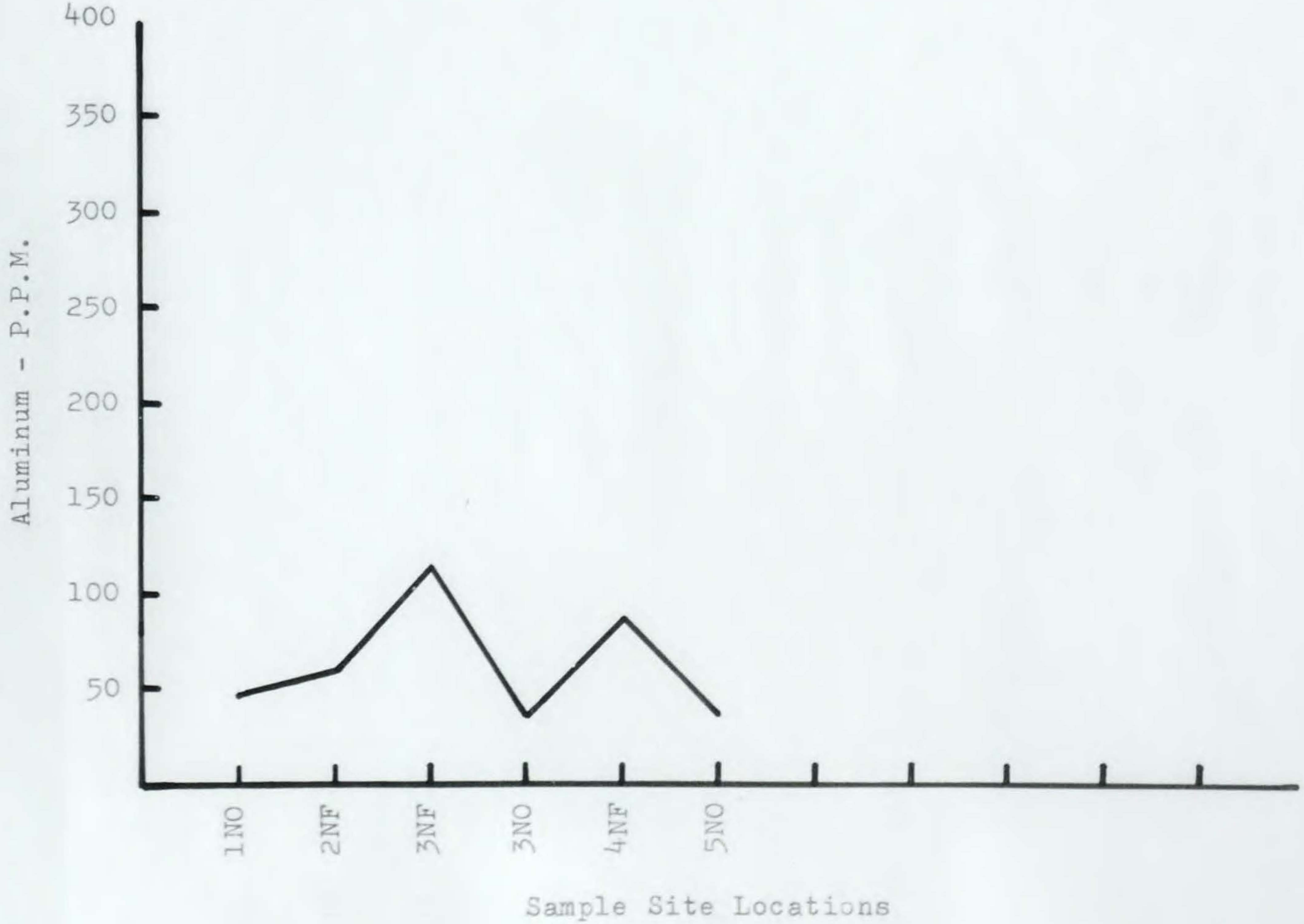
CONCENTRATION OF ALUMINUM IN NEW MEXICAN LOCUST

South Fork, Workman Creek



CONCENTRATION OF ALUMINUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



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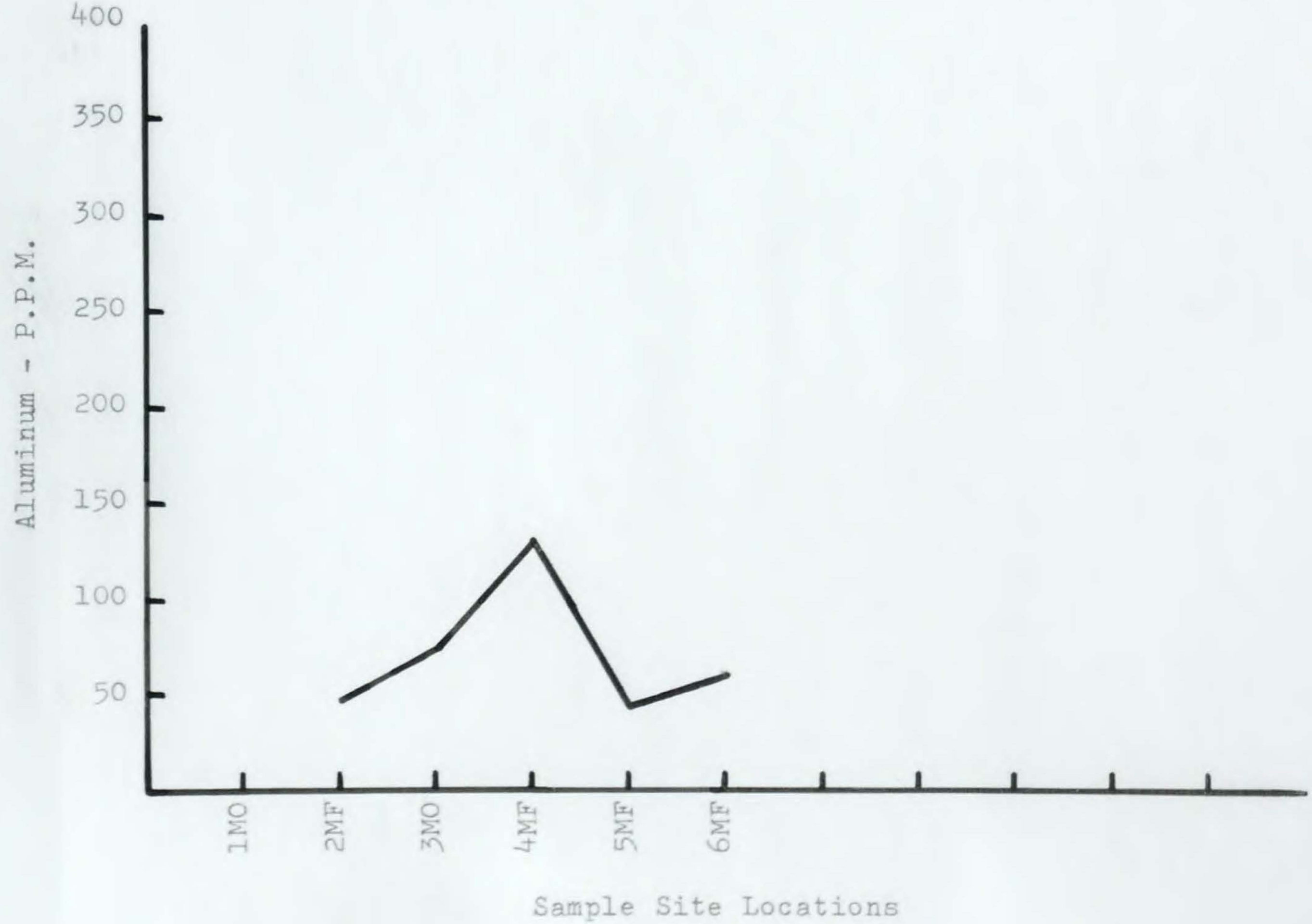
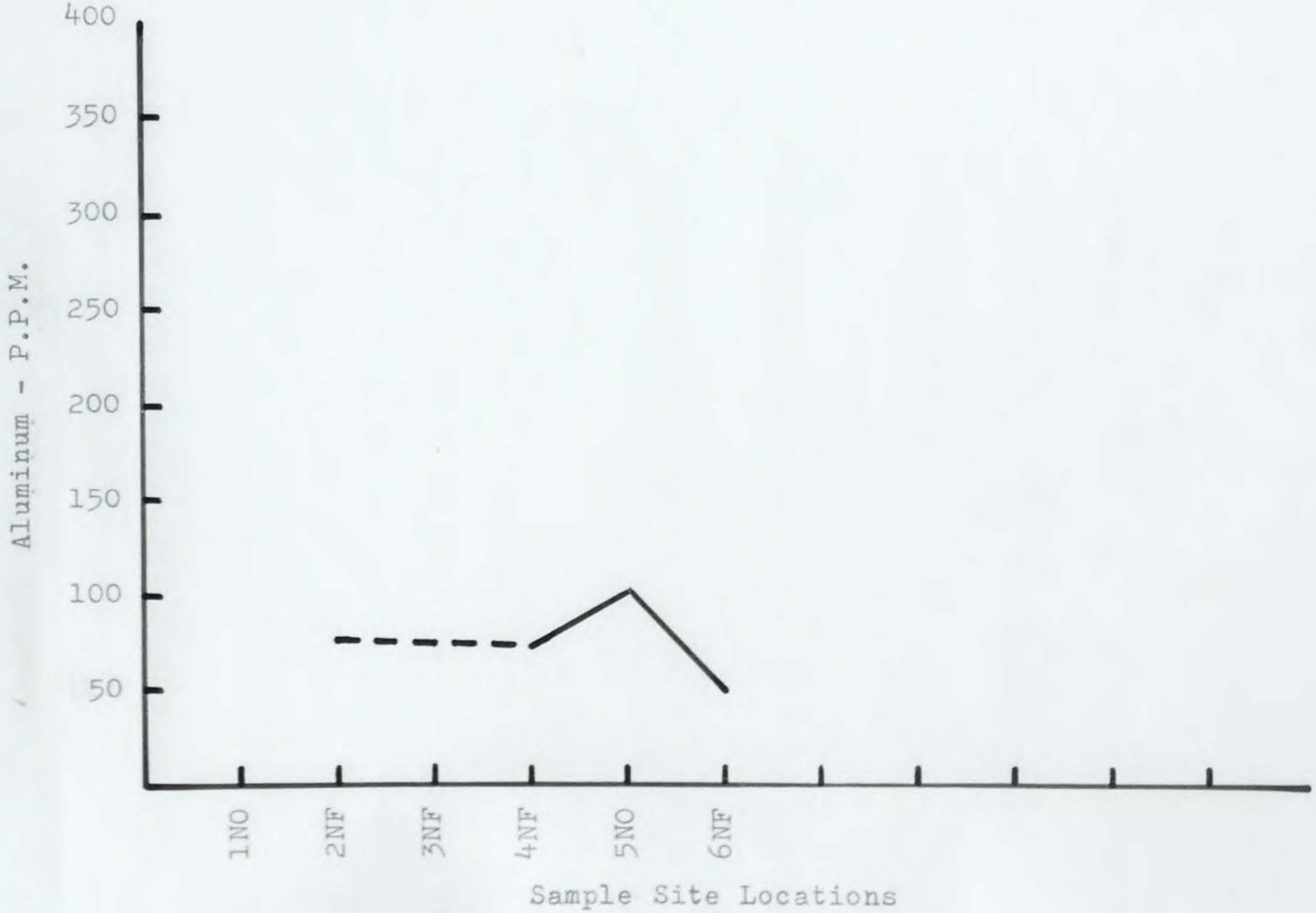
Middle Fork, Workman Creek

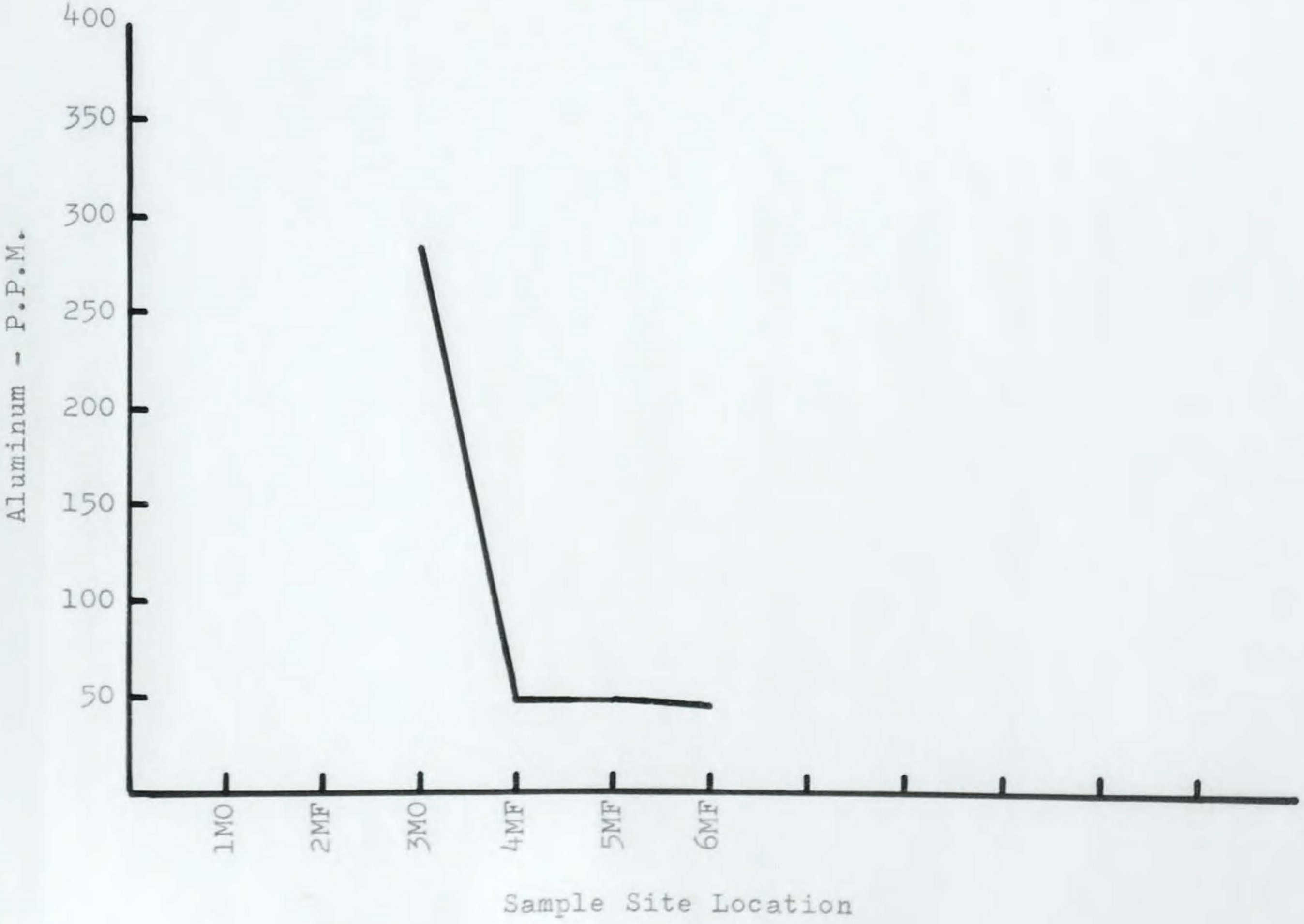


CONCENTRATION OF ALUMINUM IN BRACKEN FERN

North Fork, Workman Creek

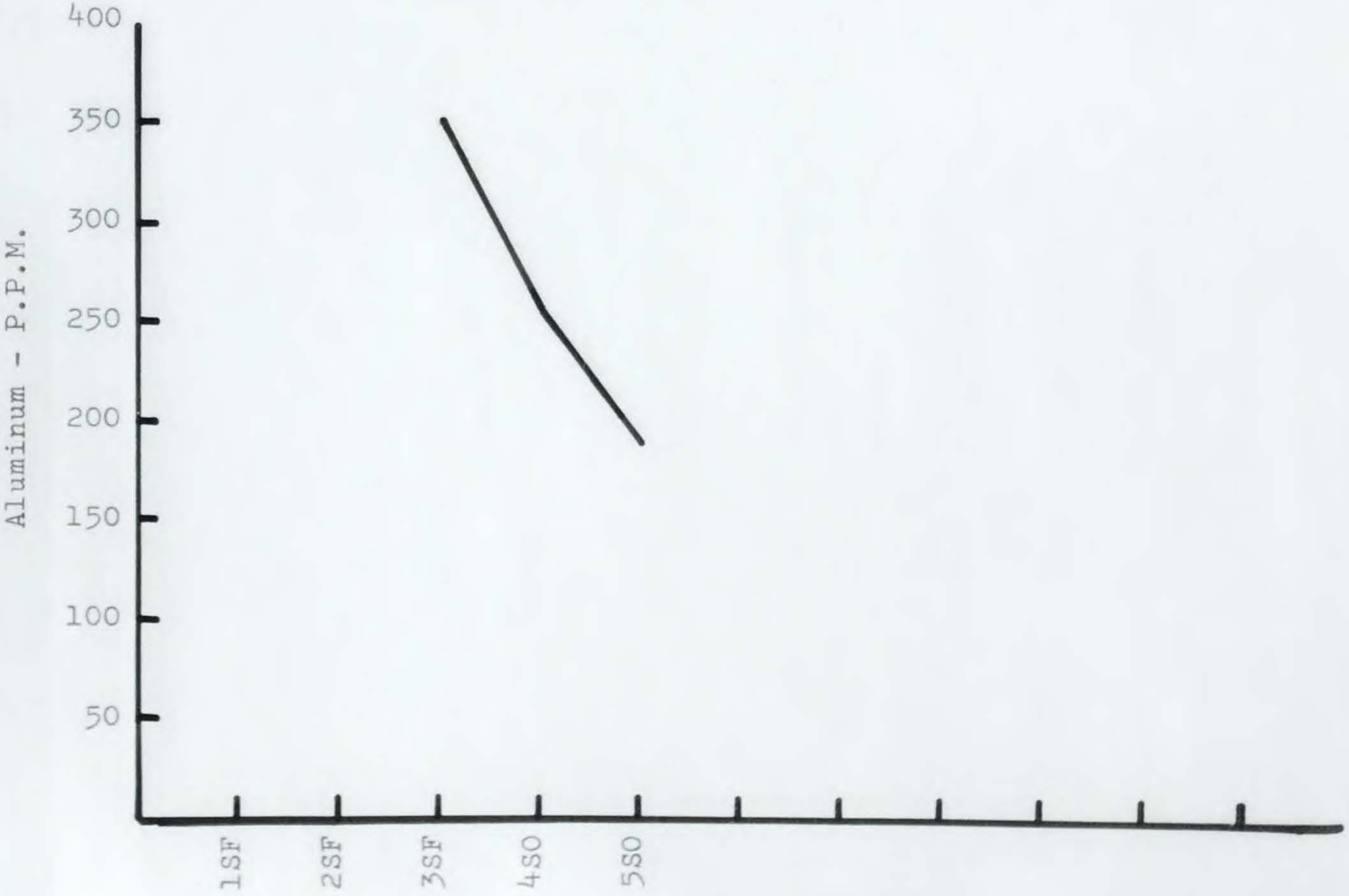


CONCENTRATION OF ALUMINUM IN BRACKEN FERN
Middle Fork, Workman Creek



CONCENTRATION OF ALUMINUM IN BRACKEN FERN

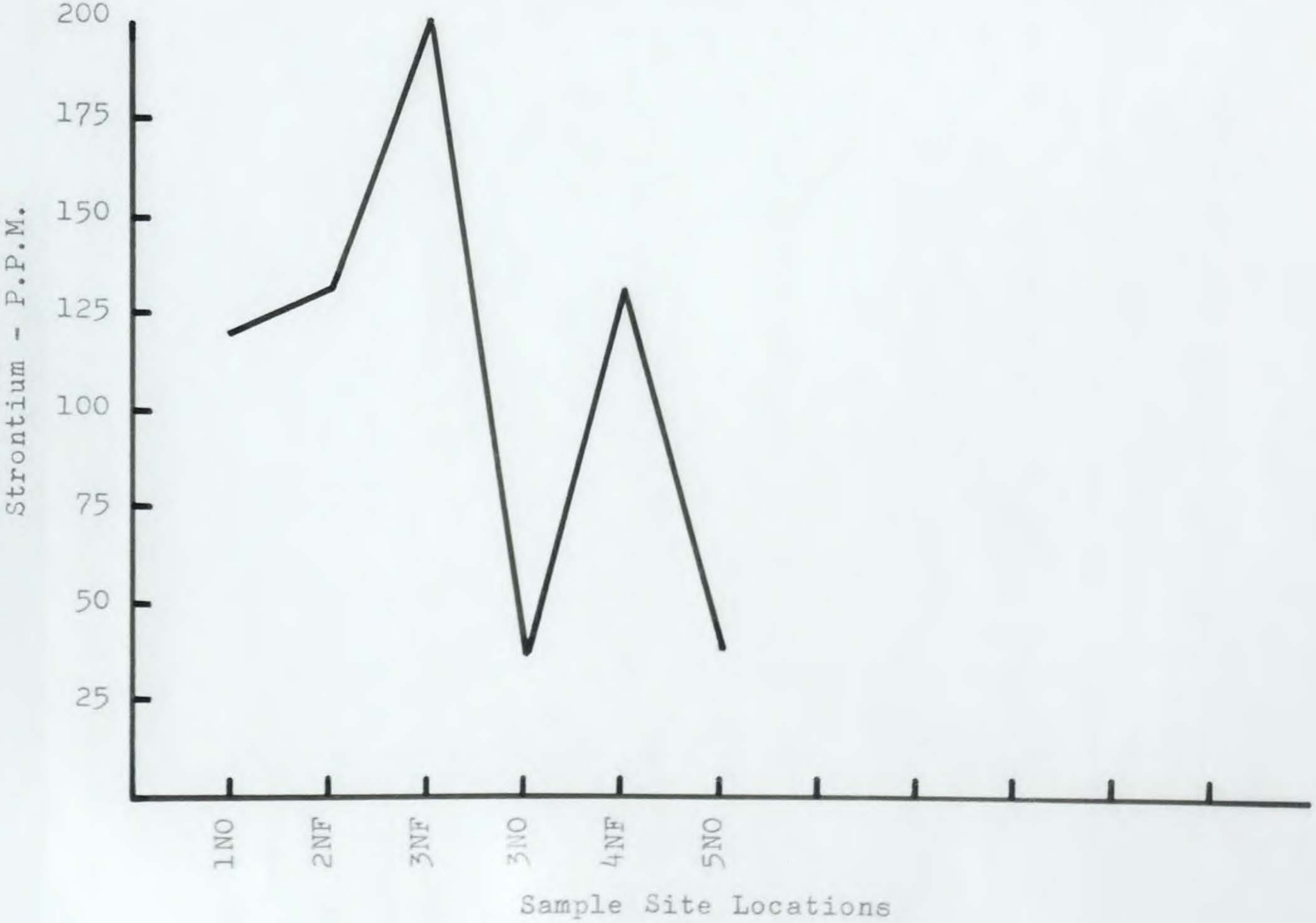
South Fork, Workman Creek



Sample Site Locations

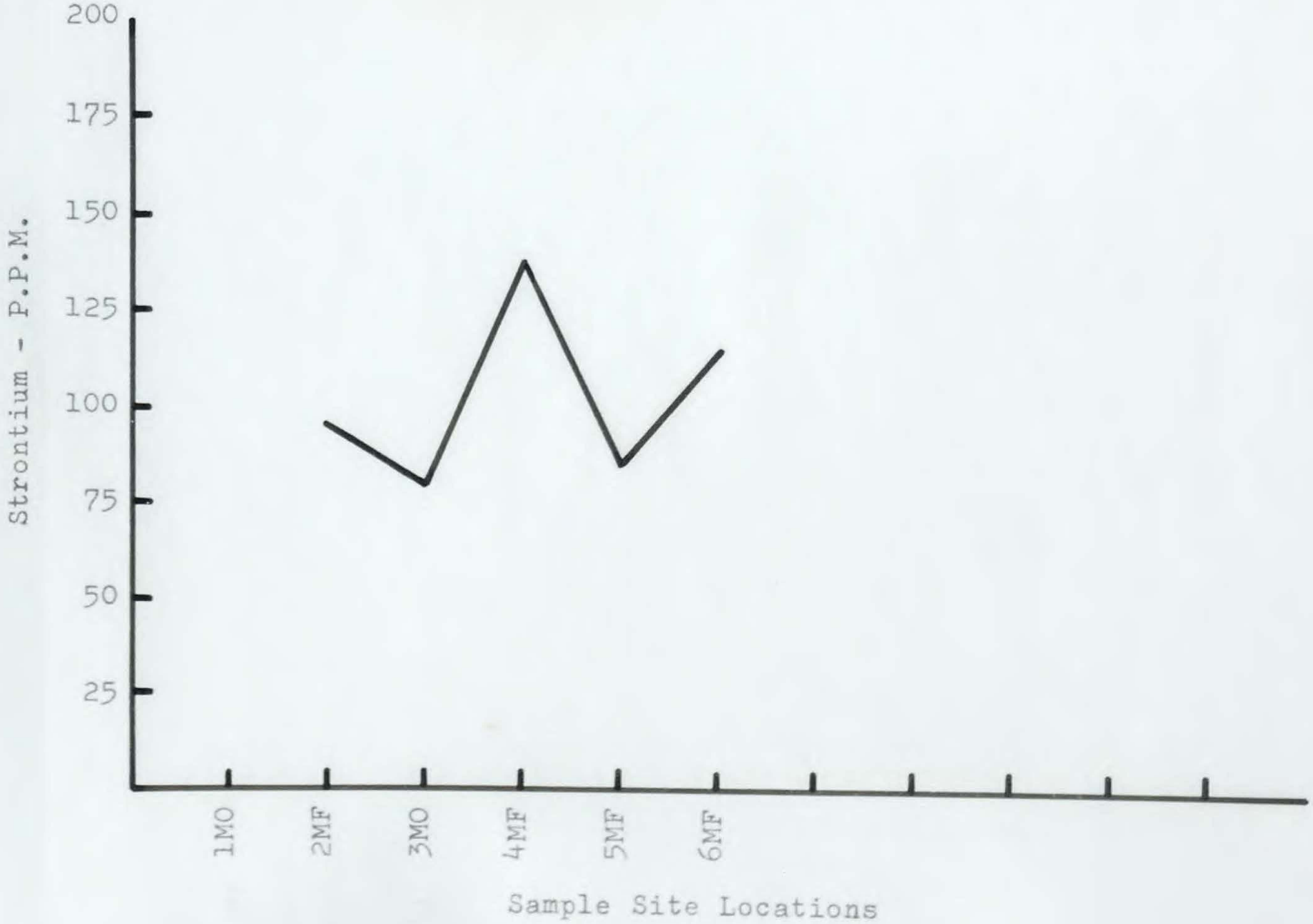
CONCENTRATION OF STRONTIUM IN NEW MEXICAN LOCUST

North Fork, Workman Creek



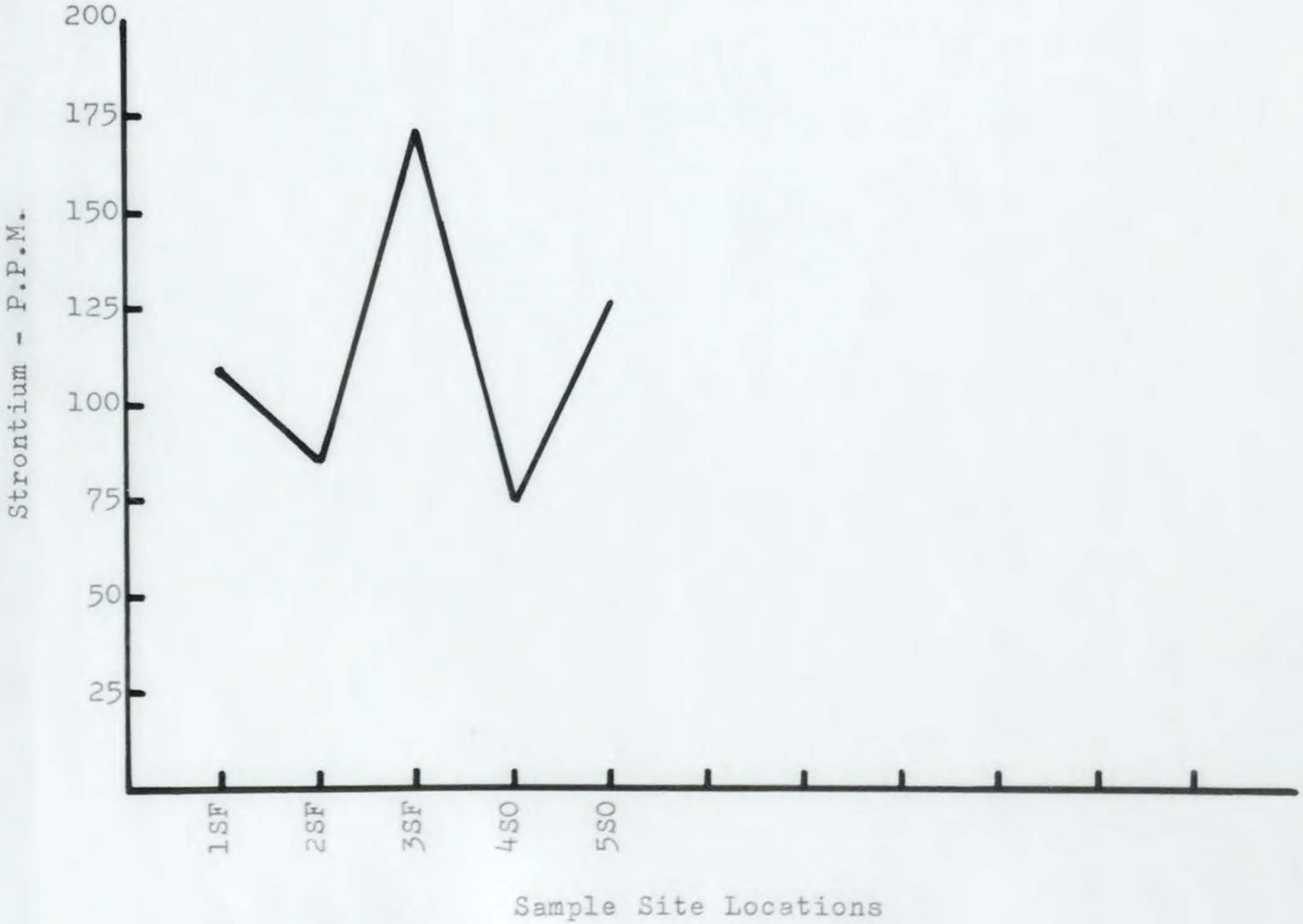
CONCENTRATION OF STRONTIUM IN NEW MEXICAN LOCUST

Middle Fork, Workman Creek



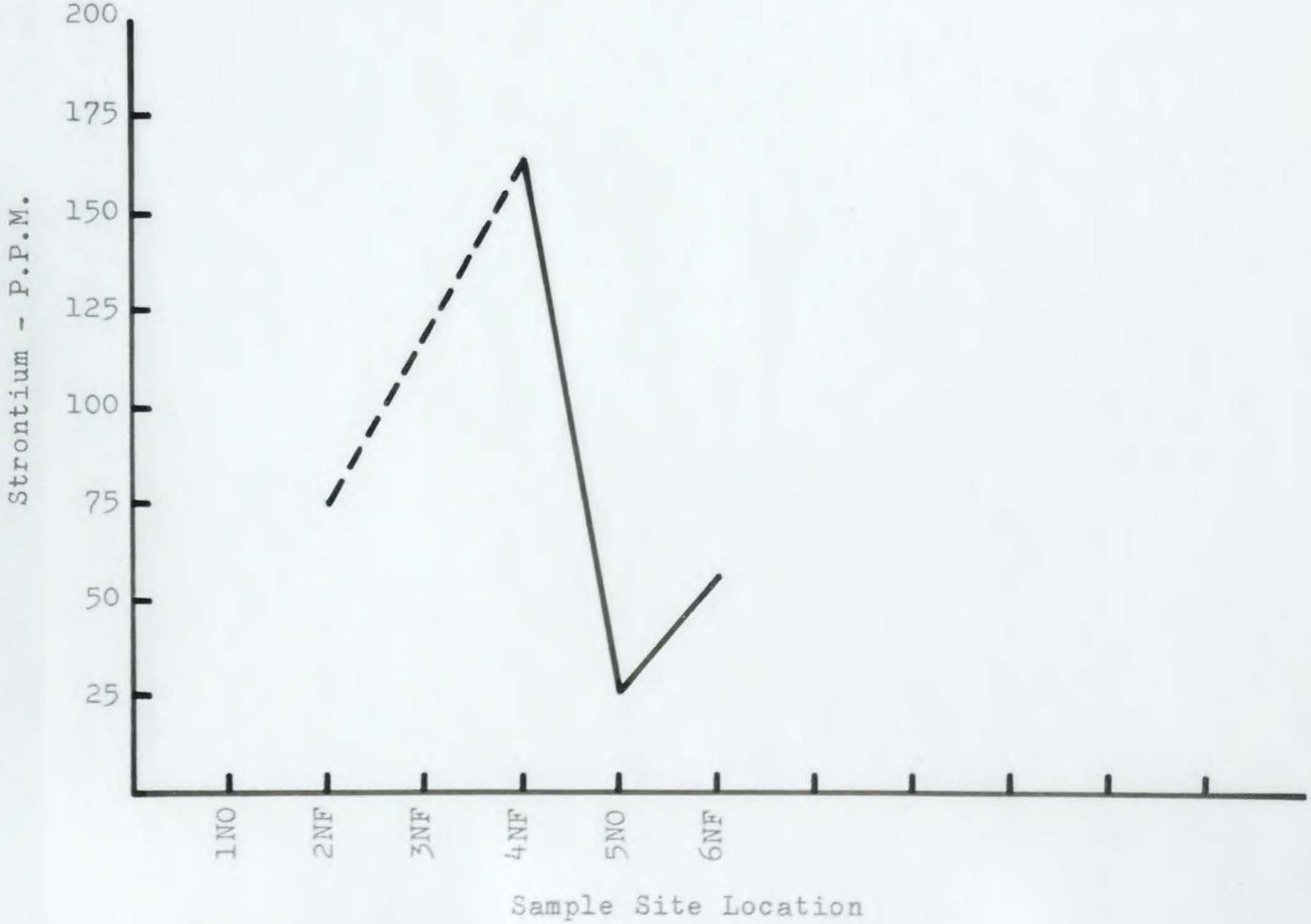
CONCENTRATION OF STRONTIUM IN NEW MEXICAN LOCUST

South Fork, Workman Creek



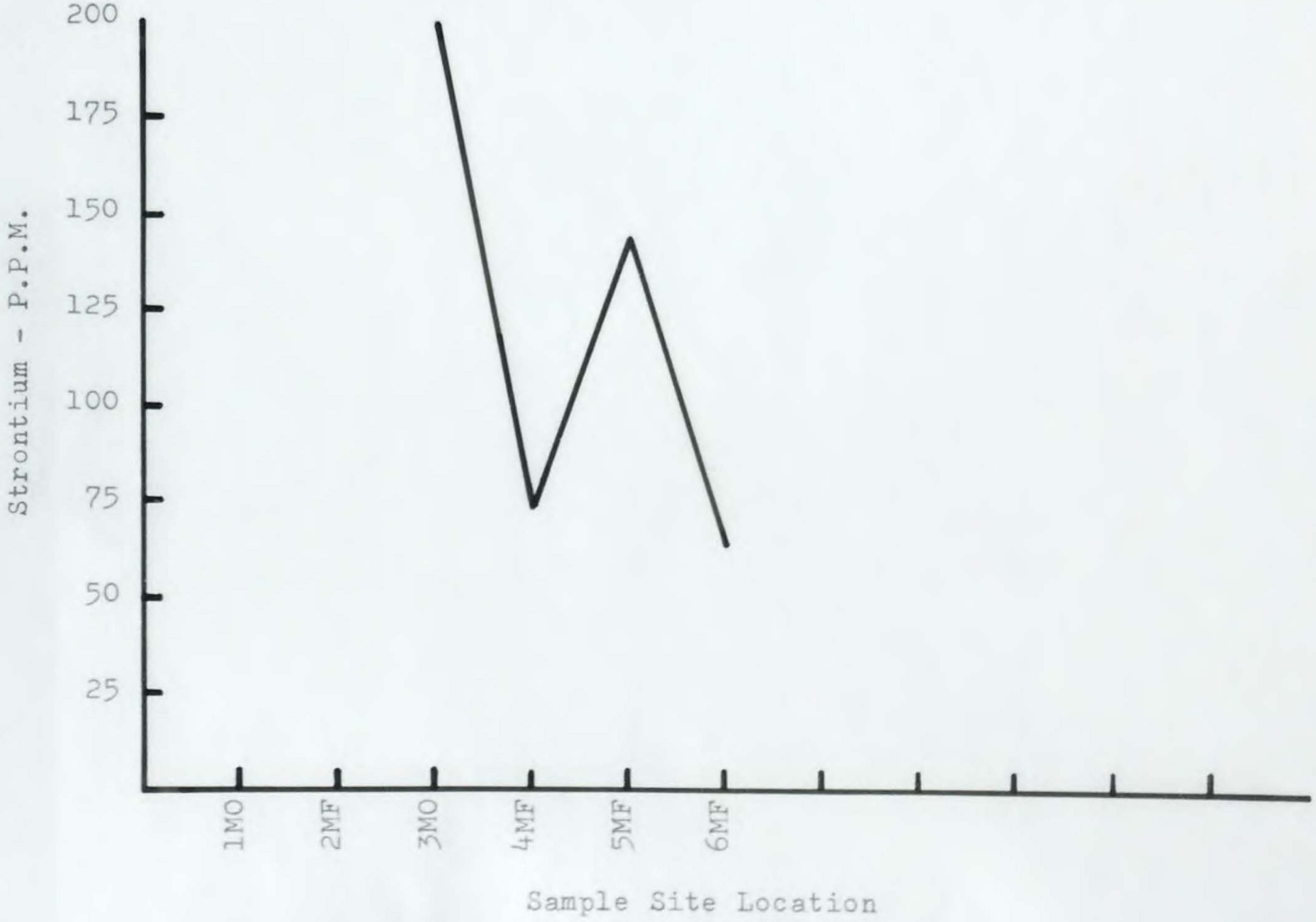
CONCENTRATION OF STRONTIUM IN BRACKEN FERN

North Fork, Workman Creek



CONCENTRATION OF STRONTIUM IN BRACKEN FERN

Middle Fork, Workman Creek



CONCENTRATION OF STRONTIUM IN BRACKEN FERN

South Fork, Workman Creek

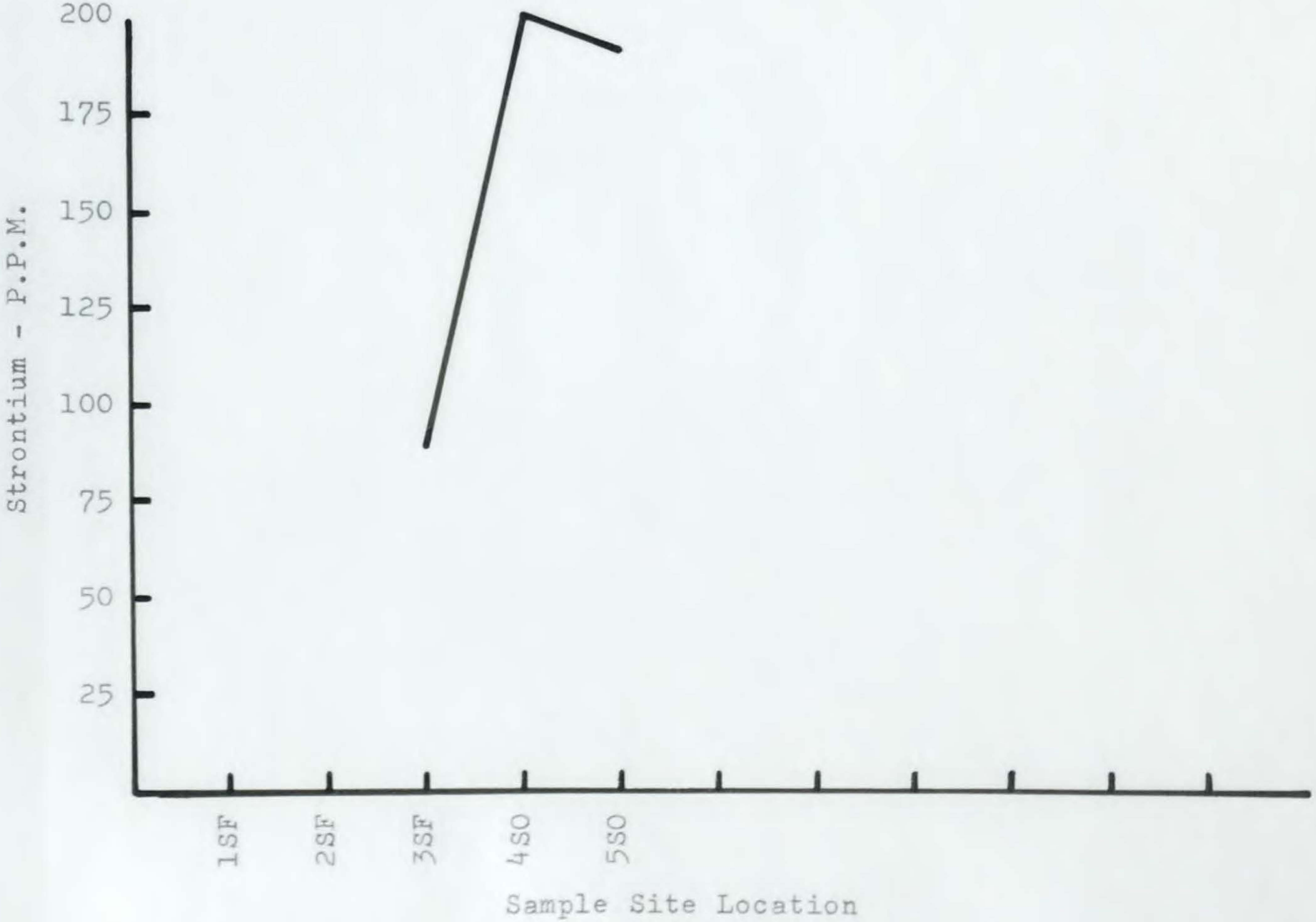


Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Four, North of Base Rock Lysimeters

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
3	11	67	4.6	7.1	14.3	23.8	27.9			
10	11	67	7.0	4.9	5.3					
17	11	67	12.1	7.2	7.1	11.4				
24	11	67		5.8	5.7	6.2				
1	12	67	18.1	11.4	5.7	7.0				
8	12	67	16.7	11.4	8.1	10.0				
27	12	67	36.5	32.9	27.8					
5	1	68	27.9	34.9	35.4	24.4				
12	1	68	26.8	31.4	35.5	36.4				
19	1	68	27.4	36.6	29.4	33.0	35.0			
26	1	68	29.6	28.6	30.0	30.8				
2	2	68	31.3	32.9	34.4	31.7				
9	2	68	29.7	29.5	30.0					
23	2	68	28.0	29.2	34.4	30.5				
1	3	68	19.0	22.9	32.1	32.3				
8	3	68	25.9	28.8	32.9	32.9				
15	3	68	26.8	32.3	33.0					
22	3	68		25.2	29.6	36.2				
29	3	68	20.7	23.8	28.3	28.0				
5	4	68	23.8	27.6	28.9	29.2				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Four, North of Base Rock Lysimeters

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
12	4	68	20.9	25.5	26.7	26.9				
19	4	68	19.1	20.0	20.8	25.0				
26	4	68	9.0	13.0	18.7	22.2				
4	5	68	10.3	14.5	15.6	18.2				
11	5	68	3.5	12.7	15.6	18.3				
18	5	68	5.4	10.9	15.8	16.5				
25	5	68	3.8	12.3	38.1	18.3				
1	6	68	15.5	2.5	10.8	13.3				
7	6	68	2.9	6.7	8.5	12.4				
14	6	68	3.0	7.2	13.1	13.6				
21	6	68	3.0	3.5	10.9	12.5				
28	6	68	0.8	9.6	12.6	13.4				
5	7	68	3.9	6.9	13.9	14.8				
12	7	68	4.3	8.3	11.0	12.2				
19	7	68	4.4	4.0	8.4	12.6				
26	7	68	18.8	13.7	14.8	17.3				
2	8	68	18.7	18.3	19.6	15.9				
9	8	68	17.7	17.5	19.1	19.5				
16	8	68	12.8	13.1	14.8	16.5				
23	8	68	9.1	11.9	18.5	18.8				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Four, North of Base Rock Lysimeters

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
29	8	68	11.9	15.2	19.3	21.2				
6	9	68	6.5	12.3	13.1	14.0				
13	9	68	5.0	8.4	9.5	10.3				
20	9	68	3.8	4.4	6.0	9.4				
27	9	68	3.3	5.6	8.3	9.3				
4	10	68	15.1	15.7	13.2	9.5				
12	10	68	10.9	13.8	11.0	14.3				
19	10	68	8.5	11.0	11.0	14.4				
26	10	68	6.9	5.8	8.3	9.6				
1	11	68	6.8	8.5	7.5	11.1				
9	11	68	6.5	9.9	9.7	10.4				
22	11	68	16.7	15.6	17.9	15.6				
30	11	68	15.0	15.1	16.0	17.1				
7	12	68	13.4	16.2	14.8	14.8				
14	12	68	13.5	16.9	14.0	13.3				
20	12	68	23.9	24.2	29.4					
27	12	68	24.8	27.6	27.7	28.9				
10	1	69	19.4	21.3	24.0	28.0				
17	1	69	27.4	33.8	35.9	40.0				
24	1	69	35.2	20.6	31.8	36.9				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Four, North of Base Rock Lysimeters

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
31	1	69	29.3	27.8	38.5	35.6				
7	2	69	27.9	27.0	27.4	28.0				
14	2	69	21.5	25.0	28.7	29.7				
21	2	69	23.9	37.5	33.0					
28	2	69	26.1	29.2	33.1	36.9				
7	3	69	25.7	25.5	27.2	27.5				
14	3	69	22.8	24.5	31.3	28.0				
21	3	69	23.4	48.8	25.0	29.1				
28	3	69	17.5	24.2	27.5	28.6				
3	4	69		18.0	21.1	20.8				
11	4	69	20.0	23.7	23.5	27.8				
18	4	69	13.0	20.0	16.7	22.9				
26	4	69	4.0	6.4	14.2	7.8				
3	5	69	4.6	9.8	15.4	15.4				
10	5	69	19.7	21.6	20.4	19.2				
17	5	69	6.6	17.5	18.2	21.5				
24	5	69	4.1	15.1	15.3	17.8				
31	5	69	4.5	12.2	17.9	12.9				
8	6	69	3.9	3.5	8.2	11.9				
12	6	69	4.2	8.5	10.8	22.4				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Four, North of Base Rock Lysimeters

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
21	6	69	4.1	9.8	17.1	13.6				
28	6	69	2.8	3.0	11.6					
7	7	69	3.7	6.1	15.5	28.2				
12	7	69	1.5	4.0	8.9	10.8				
19	7	69	8.1	6.3	8.1	12.2				
26	7	69	10.7	9.0	9.4	10.0				
2	8	69	10.6	10.0	8.5	23.0				
9	8	69	11.5	16.9	19.3	20.1				
16	8	69	8.8	7.3	15.1	17.9				
23	8	69	7.2	11.4	14.9	17.7				
29	8	69	12.1	12.7	14.2	16.9				
4	9	69	10.2	13.7	15.0	14.6				
12	9	69	19.0	16.5	23.1	23.5				
19	9	69	12.5	16.6	19.7	21.3				
26	9	69	9.1	16.2	15.1	18.5				
4	10	69	14.2	18.9	19.5	19.3				
11	10	69	9.3	14.9	16.4	16.7				
18	10	69	8.6	14.2	14.2	14.9				
25	10	69	17.3	16.2	14.7	15.0				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Dapths--Sample Site Four, North of Base Rock Lysimeters.

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
1	11	69	13.8	13.3	14.8	14.4	14.3			
8	11	69	9.9	14.4	14.9	15.5				
15	11	69	19.9	20.4	19.0	17.6				
22	11	69	19.9	20.4	20.7	22.4				
29	11	69	16.1	18.4	18.1	21.9				
6	12	69	21.1	20.4	21.0	20.7				
13	12	69	17.9	18.9	18.8	19.8				
20	12	69	15.4	17.2	17.9	19.2	18.7			
27	12	69	17.4	18.6	18.8	18.5				
3	1	70	18.2	19.6	19.5	20.6				
10	1	70	15.7	17.2	18.2	18.5				
17	1	70	17.3	17.9	19.7	20.2				
24	1	70	17.0	18.0	19.4	19.9				
31	1	70	14.2	16.7	17.5	17.7				
7	2	70	12.0	15.0	16.6	18.2				
14	2	70	17.3	17.2	17.4	17.9				
28	2	70	12.8	13.7	15.7	15.8				
14	3	70	24.9	24.8	27.0	28.5				
28	3	70	18.2	21.9	25.7	26.8				
11	4	70	14.0	16.6	19.4	19.7				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Four, North of Base Rock Lysimeters.

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
25	4	70	10.9	10.9	11.4	12.0				
9	5	70	3.4	7.2	7.3	7.4				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Five, in Deep Diabase West of the Four Drainage Watersheds

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
10	11	67	4.4	5.9	5.1	4.1	6.5			
17	11	67	4.6	6.1	5.3	3.4	8.0			
24	11	67	7.5	3.9	4.0	4.0	3.8	3.0		
1	12	67	8.0	9.2	9.8	4.7	3.7	3.1		
8	12	67	8.3	13.2	7.5	4.5	6.1	4.3	3.3	
21	12	67	21.6	14.6	39.7	13.2	19.0	21.0		
27	12	67	8.8	10.7	11.7	9.4	10.2	13.5	9.0	
5	1	68	14.5	12.5	14.6	11.8	13.8	16.9	14.9	15.6
12	1	68	9.5	8.6	10.3	7.7	9.8	9.6	10.2	11.7
19	1	68	10.3		12.6	9.7	8.6	9.0		
26	1	68	6.7	10.4	9.1	9.2	9.1	8.1	6.6	15.9
2	2	68	8.3	11.1	9.9	8.1	11.4	10.1	8.6	10.7
9	2	68	12.1	5.2	5.0	21.6	7.7	8.8	9.3	7.6
16	2	68	14.1	15.9	10.2	9.7	9.4	10.5	13.5	12.5
23	2	68	6.3	5.5	11.6	6.1	12.4	11.7	10.2	10.1
1	3	68	5.9	10.1	10.1	8.7	7.7	12.6	15.3	16.3
8	3	68	13.1	11.5	12.4	13.9	15.2	12.1	12.6	15.8
15	3	68	6.0	7.9	12.2	8.0	8.5	10.1	8.9	7.8
22	3	68	7.1	9.2	11.5	10.3	11.3	15.1	11.9	14.0
29	3	68	5.3	4.3	9.9	8.7	4.9	7.2	7.9	9.0

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Five, in Deep Diabase West of the Four Drainage Watersheds

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
5	4	68	5.4	7.2	11.0	6.0	8.3	7.7	8.3	8.7
12	4	68	6.4	9.1	11.3	7.4	6.9	14.3	11.5	16.2
19	4	68	4.3	6.3	8.3	6.1	8.1	8.1	7.7	8.3
26	4	68	2.7	6.5	6.3	7.0	11.0	13.3	12.2	10.8
4	5	68	8.2	7.7	7.9	9.5	7.1	8.1	6.1	3.3
11	5	68	2.1	3.4	5.1	8.1		7.8	9.8	11.7
18	5	68	2.8	5.0	6.0	9.4	4.8	6.1	7.2	11.0
25	5	68	2.8	3.6	5.1	5.0	6.0	5.2	5.2	6.0
1	6	68	1.3	4.4	6.5	3.9	4.9	9.7	7.7	7.4
7	6	68	1.2	2.6	6.5	5.8	8.7	8.9	10.1	8.5
14	6	68	1.3	2.8	3.3	6.1	5.0	0.6	6.9	10.3
21	6	68	2.9	5.8	4.2	4.6	3.8	4.2	4.3	4.8
28	6	68	1.9	1.9	6.3	9.0	9.5	5.1	9.3	6.6
5	7	68	2.4	5.6	5.3	5.8	5.4	7.0	7.9	9.0
12	7	68	2.9	4.2	4.0	4.1	3.9	3.6	4.9	6.4
19	7	68	4.4	4.4	5.0	4.3	5.6	5.4	7.6	6.2
26	7	68	9.8	12.2	14.7	9.0	6.4	16.8	7.7	9.6
2	8	68	6.6	9.2	10.2	6.1	10.2	9.4	9.7	11.2
9	8	68	14.6	13.0	11.8	7.3	6.1	8.3	8.1	11.0
16	8	68	4.4	5.1	7.9	4.3	5.2	4.3	3.3	6.8

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Five, in Deep Diabase West of the Four Drainage Watersheds

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
23	8	68	5.9	5.1	5.9	4.7	6.1	8.4	8.4	8.9
29	8	68	3.4	4.4	5.1	4.6	6.3	5.5	5.9	6.1
6	9	68	3.4	5.2	7.3	9.8	10.8	5.3	6.4	5.3
13	9	68	4.3	4.3	6.9	5.6	5.2	7.9	7.9	7.6
20	9	68	3.3	4.5	4.8	4.1	3.8	5.3	5.8	8.1
27	9	68	2.8	5.9	7.5	5.7	4.9	4.8	6.6	7.4
4	10	68	9.7	9.0	6.5	4.3	4.7	5.5	6.0	5.5
12	10	68	4.7	5.2	6.6	5.2	5.0	4.4	4.3	3.6
19	10	68	5.4	8.0	6.7	7.5	7.4	6.0	6.0	7.9
26	10	68	3.3	4.8	6.2	6.3	5.2	5.3	6.4	9.6
1	11	68	3.1	4.6	4.7	4.3	4.2	3.9	3.5	3.9
9	11	68	2.6	4.1	4.2	6.5	4.3	4.8	7.0	8.9
16	11	68	12.6	11.8	14.3	11.5	5.2	5.5	5.6	5.6
22	11	68	5.9	7.0	5.9	10.6	8.8	6.3	4.9	4.1
30	11	68	6.0	6.7	8.7					
7	12	68	8.4	6.5	7.4	11.5	9.5	7.9	5.6	6.6
14	12	68	5.0	8.3	7.6	9.4	7.6	6.9	6.3	8.9
20	12	68	15.4	11.0	10.6	13.3	14.6	10.5	9.2	10.0
27	12	68	9.9	9.7	12.6	11.8	10.3	11.4	5.9	5.4
10	1	69	10.0	8.3	9.4	10.0	10.6	9.7	11.1	14.3

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Five, in Deep Diabase West of the Four Drainage Watersheds

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
17	1	69	11.1	9.8	14.1	10.6	8.7	9.2	11.0	13.0
24	1	69	9.2	7.9	9.0	9.4	10.0	10.5	6.5	9.4
31	1	69	9.7	10.0	12.2	8.6	10.2	12.2	11.3	13.9
7	2	69	9.2	11.5	10.9	12.2	8.6	7.5	11.9	11.7
14	2	69	8.4	10.1	11.2	9.1	7.8	7.9		8.1
21	2	69	10.5	12.9	13.0	10.8	14.8	12.0	16.7	13.0
28	2	69	7.4	9.4	12.7	9.0	9.5	7.5	10.2	12.6
7	3	69	8.5	8.4	9.1	8.6	7.1	9.4	9.6	7.9
14	3	69	11.1	9.6	10.2	9.6	11.1	11.0	10.3	9.6
21	3	69	5.6	6.0	12.3	12.6	10.5	9.8	12.6	15.1
28	3	69	5.6	9.9	11.7	9.5	9.3	10.9	15.5	17.2
3	4	69	5.9	7.7	8.6	8.3	8.9	12.9	11.3	11.4
11	4	69	8.3	10.3	11.1	9.0	8.8	9.0	9.9	13.1
18	4	69	5.4	9.9	9.4	7.3	7.7	12.5	10.0	14.2
26	4	69	2.4	6.4	9.1	9/0	7.2	4.9	9.2	9.9
3	5	69	2.2	4.4	7.3	6.6	8.6	10.8	12.1	13.0
10	5	69	7.9	11.7	12.3	10.3	7.9	6.8	6.3	10.2
17	5	69	6.2	5.1	10.2	10.7	10.9	11.1	9.3	9.1
24	5	69	3.0	6.2	6.7	8.6	9.5	10.8	11.9	7.4
31	5	69	2.4	5.0	5.8	6.9	6.4	8.0	8.3	9.3

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Five, in Deep Diabase West of the Four Drainage Watersheds

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
8	6	69	1.6	4.8	5.9	6.4	7.2	8.7	12.7	10.2
12	6	69	1.7	4.7	3.7	5.0	8.9	9.4	8.3	8.3
21	6	69	2.0	3.8	4.8	5.7	6.3	7.2	8.2	14.2
28	6	69	1.8	3.1	5.0	4.1	5.0	4.3	4.4	4.9
7	7	69	1.9	3.4	4.2	6.1	5.2	7.1	5.7	8.1
12	7	69	1.6	2.8	4.9	3.1	5.8	6.3	5.1	5.7
19	7	69	4.3	2.9	5.7	4.2	5.8	4.6	6.2	4.8
26	7	69	5.9	7.0		5.7	5.2	5.8	5.8	7.4
2	8	69	4.8	4.4	6.5	4.5	4.8	4.8	5.4	5.2
9	8	69	5.7	5.3	5.5	4.7	4.7	5.3	5.8	7.2
16	8	69	7.9	5.9	5.3	4.1	4.1	4.9	4.1	4.7
23	8	69	3.1	3.9	3.7	3.9	4.4	3.9	4.4	3.9
29	8	69	6.9	5.4	5.5	4.9		4.7	4.7	
4	9	69	6.0	5.3	4.4	4.5	4.9	5.1	5.2	7.6
12	9	69	8.4	9.2	7.2	4.9	6.9	5.1	6.9	9.4
19	9	69	6.0	9.4	6.3	5.5	4.5	4.8	5.4	6.5
26	9	69	3.0	6.6	5.5	4.0	4.7	6.0	4.4	6.5
4	10	69	3.0	5.4	4.9	4.6	7.8	4.3	5.3	7.6
11	10	69	2.5	5.2	4.8	4.4	4.2	4.7	5.1	7.7
18	10	69	2.2	3.7	5.7	3.6	4.4	4.6	4.7	8.7
25	10	69	7.6	8.3	5.6	4.5	4.6	4.9	4.5	6.1

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Five, in Deep Diabase of the Four Drainage Watersheds.

			Depth of Soil Sample in Centimeters.							
Day	Month	Year	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
1	11	69	9.0	4.0	6.1	5.7	5.9	5.4	4.3	4.6
8	11	69	3.5	5.4	5.3	4.4	4.7	5.3	5.1	8.6
15	11	69	7.7	9.6	9.9	9.8	9.4	5.7	7.0	7.5
22	11	69	8.0	9.1	9.3	10.5	11.5	8.7	5.5	9.0
29	11	69	4.6	8.0	8.2	6.5	9.9	10.5	7.4	7.2
6	12	69	7.9	9.5	9.1	7.9	7.9	8.0	6.4	9.2
13	12	69	5.7	7.4	8.0	7.5	8.6	10.5	7.5	6.1
20	12	69	6.1	8.6	7.9	8.4	7.5	9.7	8.0	8.5
27	12	69	5.1	7.7	5.6	7.5	8.6	9.0	6.6	10.3
3	1	70	8.5	10.8	9.4	9.8	8.9	9.1	8.5	8.6
10	1	70	6.2	6.0	7.7	8.1	8.1	7.1	6.9	8.6
17	1	70	8.8	10.1	8.6	8.9	6.6	6.8	5.7	4.9
24	1	70	8.5	7.4	9.3	7.4	8.4	7.5	8.0	6.9
31	1	70	6.3	6.7	10.1	6.7	10.9	7.1	6.7	7.9
7	2	70	5.3	7.7	8.7	8.4	8.8	6.8	6.8	9.6
14	2	70	7.1	7.8	8.2	7.6	7.8	7.7	8.8	8.5
28	2	70	4.3	7.1	7.1	7.5	7.8	6.8	6.3	7.6
14	3	70	8.4	9.7	9.7	8.8	9.0	8.5	8.1	8.6
28	3	70	6.7	7.3	9.4	6.7	8.3	11.6	9.5	11.4
11	4	70	3.6	8.2	6.6	7.0	6.5	8.4	7.8	11.5
25	4	70	4.4	6.5	7.0	6.0	9.0	8.8	8.1	10.7
9	5	70	3.0	6.0	7.4	6.8	7.8	9.1	12.8	12.9

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Six, One-half Mile Below Headquarter Buildings on Parker Creek

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
10	11	67	4.6	8.0	9.5	10.3				
17	11	67	6.0	7.9	11.3	12.1	12.3	16.1		
24	11	67	17.1	8.8	9.6					
1	12	67	14.5	16.4	15.7	10.4				
8	12	67	17.8	15.8	15.2	10.2				
21	12	67	23.6	21.1	19.1	20.2				
27	12	67	20.9	19.5	17.4					
5	1	68	21.4	18.4	21.1	19.3	19.2	18.8		
12	1	68	14.6	16.4	17.2	16.8				
19	1	68	17.1	17.7	15.2	17.2				
26	1	68	14.2	17.7	15.2	15.7				
2	2	68	17.4	17.2	23.6	15.0	15.4	15.5		
9	2	68	26.8	18.5	17.5	17.2	17.8			
16	2	68	16.7	18.3	17.8					
23	2	68	30.4	21.3	17.0	18.4				
1	3	68	25.0	15.4	18.1	18.4				
8	3	68	23.1	18.7	19.6	18.7				
15	3	68	13.3	17.1	15.5	15.8				
22	3	68	29.4	23.8	19.3	20.3				
29	3	68	14.5	16.7	18.0	19.0				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Six, One-half Mile Below Headquarter Buildings on Parker Creek

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
5	4	68	16.7	12.8	15.2	15.5				
12	4	68	12.3	14.3	16.1	14.1				
19	4	68	9.6	30.6	11.3	12.2				
26	4	68	11.8	11.2	13.8	12.3				
4	5	68	3.9	10.3	14.5	11.5				
11	5	68	5.0	9.2	10.9	11.9				
18	5	68	7.14	13.1	13.4	12.1				
25	5	68	3.9	10.7	11.5	11.1				
1	6	68	2.5	8.1	9.5	9.7				
7	6	68	3.0	7.6	11.8	10.0				
14	6	68	2.7	7.5	7.2	8.5				
21	6	68	2.7	6.6	7.1	8.6				
28	6	68	3.8	5.9	8.6	8.0				
5	7	68		6.7	7.8	8.9				
12	7	68	2.8	6.9	8.4	12.2				
19	7	68	9.3	7.7	8.5	8.6				
26	7	68	16.7	17.4	9.7	13.9				
2	8	68	17.5	18.0	19.1	20.5	19.0			
9	8	68	14.9	16.8	16.7	18.0	16.7			
16	8	68	10.4	14.5	14.9	14.7	9.9			

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Six, One-half Mile Below Headquarter Buildings on Parker Creek

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
23	8	68	10.7			11.6				
29	8	68	8.4	13.5	13.5	12.9				
6	9	68	11.8	13.1	14.0	13.8	12.7			
13	9	68	9.0	16.7	15.2	14.4	14.5			
20	9	68	5.1	10.2	10.9	10.9	9.3			
27	9	68	6.8	9.5	10.2	9.6	9.7	9.6		
4	10	68	11.1	7.3	8.9	10.1				
12	10	68		9.9	10.2	11.1	10.7			
19	10	68	7.9	10.8	12.6	9.6	9.5			
26	10	68	5.8	7.3	7.9	8.3				
1	11	68	5.6	7.4	4.6	8.5	7.6			
9	11	68	6.9	9.8	8.7	7.3				
16	11	68	19.4	18.3	18.8	19.8	18.1			
22	11	68	21.5	15.3	15.9	15.9				
30	11	68	12.1	13.6	13.0	14.1	12.7	15.2		
7	12	68	13.3	13.6	13.4	13.2	12.7			
14	12	68	13.0	15.6	13.7	12.3				
20	12	68	23.4	19.4	17.7	15.8	15.2			
27	12	68	20.2	18.2	17.9	16.0	16.1			
10	1	69	15.5	15.9	16.7	16.0	16.1			

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Six, One-half Mile Below Headquarter Buildings on Parker Creek

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
17	1	69	16.8	17.0	17.4	17.3	19.1	17.9		
24	1	69	22.1	21.1	21.7	22.1				
31	1	69	17.0	18.0	23.4	23.5	21.5			
7	2	69	18.1	17.2	17.7	16.4	16.1			
14	2	69	15.3	14.8	15.0	17.1	17.0			
21	2	69	19.8	18.3	18.6	20.2	19.5			
28	2	69	16.0	17.9	18.7	18.3	16.3	16.9		
7	3	69	11.9	14.1	15.2	18.3				
14	3	69	18.4	17.3	18.7	16.7				
21	3	69	12.7	15.4		17.4	16.3			
28	3	69	12.5	15.5	16.3	16.5	16.7	18.1		
3	4	69	10.7	14.6	16.7	16.3	17.1			
11	4	69	12.2	12.7	14.8	13.8	13.8	12.7		
18	4	69	9.2	11.4	11.5	13.5	13.9			
26	4	69	7.4	13.2	13.6	14.4				
3	5	69	9.9	10.6	13.1	5.5	19.7	19.5		
10	5	69	29.3	17.1	17.6	18.0	20.7	15.1		
17	5	69	10.6	9.9	11.7	13.7	13.8			
24	5	69	6.7	14.8	14.6	14.6	15.7			
31	5	69	9.8	6.2	8.9	12.8	12.5			

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Six, One-half Mile Below Headquarter Buildings on Parker Creek

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
8	6	69	4.5	6.6	9.3	10.4	10.7			
12	6	69	2.6	6.8	9.9	10.7	12.2	6.9		
21	6	69	5.1	7.3	9.4	11.1	10.7			
28	6	69	1.4	6.0	7.3	8.2	9.6	9.1		
7	7	69	4.0	7.6	8.7	9.3	11.3	10.2		
12	7	69	2.2	6.5	7.0	9.4	8.5	7.3		
19	7	69	10.7	9.8	7.4	8.1	9.1			
26	7	69	19.5	16.1	10.8	7.6	8.0			
2	8	69	9.1	9.8	8.8	8.8	9.0	9.0		
9	8	69	9.6	9.7	12.3	9.7	8.2	9.2		
16	8	69	17.0	17.6	13.8	13.2	12.0	9.4		
23	8	69	8.4	13.4	12.4	10.5	9.0			
29	8	69	7.0		15.9	12.3	11.4	8.3		
4	9	69	12.5	12.9	13.5	9.0	8.7			
12	9	69	17.0	17.9	10.1	9.0	9.0			
19	9	69	10.4	15.2	7.9	7.7	7.5			
26	9	69	6.9	13.6	8.0	8.2	8.4			
4	10	69	5.2	10.6	7.2	7.6	8.4			
11	10	69	5.0	4.8	6.7	6.3	6.5			
18	10	69	4.5	9.7	7.4	7.3	7.2			
25	10	69	19.8	20.0	17.0	10.1	6.9			
1	11	69	13.3	13.1	8.9	7.8	7.1			
8	11	69	10.7	14.8	11.9	13.0	10.9			
15	11	69	16.2	19.9	17.0	17.2	15.0			

Table 12 Percentage Moisture in Sirra Ancha Soil Samples at Various Depths--Sample Site Six, One-Half Mile Below Headquarter Buildings on Parker Creek.

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
22	11	69	16.0	17.5	16.0	16.7	14.6			
29	11	69	16.3	19.7	18.9	18.0	17.8			
6	12	69	19.7	18.3	16.9	17.6	14.4			
13	12	69	14.7	16.9	15.6	15.9	14.2			
20	12	69	15.6	19.0	15.6	15.9	16.2			
27	12	69	16.8	19.0	16.3	16.3	16.2			
3	1	70	20.1	17.5	16.4	17.1	15.6			
10	1	70	16.6	16.0	16.1	16.6	16.6			
17	1	70	38.0	16.5	15.7	15.9	15.3			
24	1	70	15.9	19.2	17.4	17.7	17.2			
31	1	70	12.8	15.9	14.5	14.5	14.4			
7	2	70	16.3	18.3	16.1	16.0	16.4			
14	2	70	15.8	18.8	18.1	15.2	15.6			
28	2	70	11.1	16.7	13.3	13.1	12.3			
14	3	70	19.7	21.2	17.5	18.1				
28	3	70	11.7	17.9	13.9	14.7	15.0			
11	4	70	13.5	17.7	15.9	15.0				
25	4	70	11.1	12.7	18.4	13.3				
9	5	70	6.6	16.5	11.3	12.4	13.4			

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Seven, 500 Feet West of Access Road to Peterson Ranch Meadow on Survey Baseline

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
3	11	67	9.8	18.3	14.9	7.8				
10	11	67	14.9	15.0	17.0	12.8				
17	11	67	15.4	13.2	17.5					
24	11	67		14.8	11.2	10.3				
1	12	67	31.4	45.5	36.7	18.2				
8	12	67	30.8	57.5	31.0	25.0				
27	12	67	36.9	31.2	32.9	26.9	22.4			
5	1	68	39.5	30.5	24.7					
12	1	68	47.4	48.1	29.8	29.6				
19	1	68	43.8	40.9	28.6					
26	1	68	58.6	44.4	15.9					
2	2	68	46.9	39.2	27.1	24.8				
16	2	68	77.8	41.4	27.6	21.5				
23	2	68	65.7	46.3	38.2	33.0				
15	3	68	45.8	42.9	32.2	37.1				
5	4	68	62.8	45.2	40.4	42.4				
12	4	68	48.1	31.0	27.6					
19	4	68	50.0	42.4	33.3	34.4				
26	4	68	50.0	60.9	57.6	23.8				
4	5	68	43.8	36.4	22.9	21.4				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Seven, 500 Feet West of Access Road to Peterson Ranch Meadow on Survey Baseline

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
11	5	68	45.1	42.3	42.2	26.2				
18	5	68	37.5	45.6	46.7	26.0				
25	5	68	19.4	18.6	20.4	17.5				
1	6	68	17.1	18.8	13.6	16.0				
7	6	68	12.0	12.8	29.8	11.1				
14	6	68	24.4	32.5	32.9	16.2				
21	6	68	12.9	14.3	15.0					
28	6	68	29.6	25.9	23.7	15.4				
5	7	68	25.5	26.5	20.7	11.0				
12	7	68	12.9	21.6	25.6	19.8				
19	7	68	33.3	25.5	26.8	23.1				
26	7	68	31.3	47.1	36.4	60.0				
2	8	68	52.4	47.6	48.1	49.2				
9	8	68	60.0	53.1	52.4	42.7				
16	8	68	41.9	33.3	40.0	34.3				
23	8	68	37.8	42.9	36.7	37.2				
29	8	68	36.7	40.0	40.6	34.4				
6	9	68	33.3	24.5	39.3	32.1				
13	9	68	28.4	36.0	28.7	23.2				
20	9	68	15.9	19.4	23.1	14.1				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Seven, 500 Feet West of Access Road to Peterson Ranch Meadow on Survey Baseline

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
27	9	68	14.5	16.5	27.9	24.3				
4	10	68	44.4	47.8	33.9	38.5				
12	10	68	30.7	25.0	23.2	24.0				
19	10	68	16.4	28.4	27.3	28.2				
26	10	68	15.1	13.8						
1	11	68	15.0	21.4	10.1	17.0				
9	11	68	19.2	27.1	20.0	11.3				
16	11	68	37.7	28.8	24.0	28.6				
22	11	68	42.1	29.2	29.6	19.0				
30	11	68	34.4	29.7	36.4	26.5				
7	12	68	46.9	43.9	44.6	41.8				
14	12	68	40.0	36.5	30.4	30.0				
27	12	68		45.7	46.7	50.0				
10	1	69	80.0	55.0	50.0	43.9				
17	1	69	38.6	35.5	34.9	32.3				
24	1	69	66.7	44.7	40.0	28.4				
31	1	69	58.6	55.4	49.2	44.6				
7	2	69	65.1	52.6	28.8	22.2				
14	2	69	52.9	22.0	28.3	26.2				
21	2	69	50.8	39.8	42.9	43.3				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Seven, 500 Feet West of Access Road to Peterson Ranch Meadow on Survey Baseline

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
28	2	69	57.1	46.0	50.0	40.0				
7	3	69	60.9	50.0	42.5	64.8				
14	3	69	50.9	47.7	47.3	47.8				
21	3	69	51.6	58.2	53.1	32.5				
28	3	69	51.8	52.4	48.1	29.8				
3	4	69	46.4	52.1	48.1	35.7				
11	4	69	45.3	34.5	33.3	25.8				
18	4	69	48.6	44.2	40.0	35.9				
26	4	69	42.1	37.9	33.3	36.2				
3	5	69	39.0	29.7	39.0	35.8				
10	5	69	41.3	50.0	45.8	20.0				
17	5	69	22.0	15.9	35.4	31.7				
24	5	69	46.0	43.1	40.0	35.6				
31	5	69	31.3	34.9	36.2	28.8				
8	6	69	25.0	29.9	25.3	26.0				
12	6	69	27.8	22.2	30.0	24.5	17.2			
21	6	69	19.7	23.2	11.9	15.5				
28	6	69	26.2	30.9	19.7					
7	7	69	13.5	25.0	11.5	17.7				
12	7	69	20.3	23.9	20.3	18.6				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Seven, 500 Feet West of Access Road to Peterson Ranch Meadow on Survey Baseline

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
19	7	69	40.4	36.5	38.1	27.9				
26	7	69	38.8	39.0	37.4	36.5				
2	8	69	41.4	38.2	42.8	29.0				
9	8	69	43.1	43.6	37.4	42.4				
16	8	69	38.0	30.0	27.7	16.5				
23	8	69	31.6	35.6	35.7	34.5				
29	8	69	36.9	39.7	38.2	41.5				
4	9	69	40.2	38.3	32.5	26.9				
12	9	69	34.2	28.4	24.1	30.6				
19	9	69	24.7	27.9	29.2	32.7				
26	9	69	10.8	16.5	16.3	14.2				
4	10	69	14.5	16.7	19.8	21.7				
11	10	69	19.0	19.6	19.7	21.0				
18	10	69	15.8	16.4	19.5	17.9				
25	10	69	50.3	32.4	26.8	32.1	27.3			
1	11	69	44.9	38.3	27.8	23.6				
8	11	69	39.5	34.0	26.9	21.4				
15	11	69	51.8	51.4	52.5	34.2				
22	11	69	52.9	63.2	77.0	65.4				
29	11	69	49.7	56.4	62.2	66.7				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Seven, 500 Feet West of Access Road to Peterson Ranch Meadow on Survey Baseline.

			Depth of Soil Sample in Centimeters							
Day	Month	Year	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
6	12	69	50.7	61.7	73.2	73.4				
13	12	69	52.2	59.6	71.6	81.2				
20	12	69	47.4	56.2	61.9	72.1				
27	12	69	51.9	61.3	53.0	64.4				
3	1	70	52.9	66.7	72.0	55.3				
10	1	70	66.8	55.1	60.9	60.6				
17	1	70	59.0	57.3	66.2	72.5				
24	1	70	52.1	58.9	69.9	78.8				
31	1	70	52.8	56.7	70.8	76.7				
7	2	70	51.4	57.8	71.7	78.1				
14	2	70	51.5	59.1	77.2	82.8				
28	2	70	51.0	59.6	58.4	63.8				
14	3	70	58.9	69.3	80.5	94.2				
28	3	70	52.7	65.3	68.5					
11	4	70	49.1	55.3	62.4	42.7				
25	4	70	52.0	54.7	61.4	63.0				
9	5	70	46.2	53.7	59.8	66.8				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Eight, in Open Area 300 Feet East of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
10	11	67	15.6	15.6	19.3	18.8	16.5	22.6	20.0	30.5
17	11	67	13.9	16.7	19.0	18.9	21.4	18.5	21.6	22.5
24	11	67	26.3	19.2	14.0	15.9	18.6	18.1	17.8	19.6
1	12	67	26.0	26.7	17.9	11.1	13.6	14.4	18.6	25.0
8	12	67	29.1	26.7	14.6	13.0	14.3	16.0	18.4	26.8
27	12	67	29.4	32.0	14.3	13.6				
5	1	68	33.9	34.0	19.4	13.6	22.6	26.8	21.7	20.6
12	1	68	30.0	22.5	20.0	22.9	18.9	20.5		
19	1	68	41.4	34.2		24.7	25.8	24.5	29.1	
26	1	68		40.7	25.0					
2	2	68	31.5	29.8	28.7	27.9	34.9	29.5	29.0	29.9
16	2	68	36.3	38.9	29.8	24.5	31.3	30.3	28.7	29.6
23	2	68	31.4	32.9	35.0	31.5	32.9	29.5	30.8	
15	3	68	32.6	30.5	30.5	31.4	26.5	29.8	34.1	36.3
22	3	68	31.9	32.1	49.3	31.0	24.0	27.9	27.9	
29	3	68	30.7	33.8	36.6	39.5	38.3	36.8	41.9	52.5
5	4	68	29.3	29.2	28.7	33.0	33.3	46.2	43.3	51.2
12	4	68	26.7	33.3		41.9	41.0	47.9	34.9	36.5
19	4	68	35.6	38.4	35.4	40.0	36.5	38.9	35.2	32.3
26	4	68	30.0	31.9	31.8	31.4	31.2	36.3	31.1	40.5

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Eight, in Open Area 300 Feet East of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
4	5	68	24.2	28.2	28.8	27.3	24.5	28.6	29.9	
11	5	68	24.7	25.0	27.6	29.9	32.1	32.8	30.5	33.7
18	5	68	10.4	18.2	27.8	24.2	24.2	20.9	20.0	26.1
25	5	68	8.1	17.9	23.1	21.0	20.9	22.6	26.4	26.5
1	6	68	6.7	10.0	15.7	18.1	21.7	20.5	22.5	24.4
7	6	68	10.3	12.3	17.9	20.2	23.6	24.1	24.7	28.2
14	6	68	8.2	17.0	21.0	28.1	32.8	27.5	28.4	26.9
21	6	68	7.6	12.2	14.6	18.6	28.4	26.3	27.2	28.0
28	6	68	9.0	12.2	10.1	17.3	25.2	25.0	25.8	24.0
5	7	68	10.7	10.2	12.0	9.1	16.5	20.0	25.0	26.6
12	7	68	13.5	12.4	16.5	24.1	26.7	28.8	27.9	24.7
19	7	68	17.5	15.0	15.0	29.2	19.7	23.6	24.7	25.9
26	7	68	29.9	25.4	18.4	19.3	20.8	27.8	25.0	23.9
2	8	68	32.1	38.5	28.8	24.5	30.0	29.8	35.5	33.3
9	8	68	27.0	27.5	29.9	28.2	28.4	25.0	27.2	30.0
16	8	68	26.9	25.9	31.0	29.1	29.2	38.7	26.7	27.3
23	8	68	13.9		12.6	12.0	9.4	17.5	16.2	17.8
29	8	68	15.7	19.2	23.8	21.0	22.2	22.7	24.7	25.9
6	9	68	12.1	14.6	20.8	17.7	17.1	16.7	16.9	22.9
13	9	68	9.9	15.8	21.3	26.9	27.6	22.2	26.2	27.1

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Eight, in Open Area 300 Feet East of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
20	9	68	11.8	13.0	20.2	26.4	26.7	27.3	26.6	25.0
27	9	68	8.0	13.3	16.4	22.9	24.2	26.7	27.6	26.7
4	10	68	24.6	21.1	19.8	26.6	27.3	28.0	27.7	26.4
12	10	68	21.0	16.7	16.8	8.0	19.0	21.9	25.3	27.2
19	10	68	12.7	13.0	14.4	19.4	20.0	24.0	22.5	28.9
26	10	68	9.4	13.7	12.9	20.7	21.0	21.2	23.9	24.4
1	11	68	12.3	16.2	18.0	23.8	26.3	26.3	26.0	22.4
9	11	68	11.6	12.8	12.4	11.0	26.9	22.4	23.0	19.6
16	11	68	25.0	18.2	17.2	14.3	17.2	20.0		
22	11	68	30.6	28.6	17.3	18.2	18.8	21.4	23.1	24.4
30	11	68	28.8	24.5	21.8			19.5	25.0	25.0
7	12	68	36.5	30.8	27.6	25.3	27.0	27.7	27.7	27.9
14	12	68	29.1	24.2	26.0	20.0	21.3	24.7	26.2	19.7
27	12	68	32.0	29.2	23.2	27.1	19.4	20.9		26.7
10	1	69	34.9	33.8	26.3	26.9	22.9	22.7	24.6	25.5
17	1	69	35.4	33.3	26.1	33.8	32.0	32.8	29.7	27.1
24	1	69	41.2	41.5	35.6	34.4	35.7	35.4	34.3	37.2
31	1	69	36.5	36.9	31.5	35.1	41.6	39.4	34.6	33.9
7	2	69	31.4	28.3	34.5	35.4	33.7	34.9	34.0	36.2
14	2	69	33.8	32.5	32.1	26.9	31.9	33.0	31.6	30.4

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Eight, in Open Area 300 Feet East of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
21	2	69	34.2	31.8	33.0	33.3		35.0	34.0	32.8
28	2	69	44.9	32.5	32.3	30.1	31.2	32.4	31.7	30.7
7	3	69	42.9	31.3	31.5	30.6	33.3	31.6	32.2	32.3
14	3	69	40.0	30.7	28.0	29.5	29.2	29.9	31.7	36.9
21	3	69	32.2	34.4	29.3	29.0	31.6	33.3	34.8	31.8
28	3	69	34.6	30.5	29.5	43.4	48.4	37.0	35.9	33.6
3	4	69	35.7		36.0	37.4	42.4	40.0	39.1	37.8
11	4	69	32.9	34.4	33.3	34.4	40.2	35.9	37.2	34.7
18	4	69	25.0	27.4	28.6	29.4	28.9	29.3	31.1	28.6
26	4	69	20.2		25.7	30.3	30.4	28.9	27.3	27.8
3	5	69	14.5	20.0	24.1	27.1	30.2	32.5	31.7	34.3
10	5	69	30.3	31.2	29.6	26.2	28.4	32.4	36.3	34.1
17	5	69	18.4	25.4	27.7	31.8	28.0	27.6	28.4	27.9
24	5	69	15.7	20.8	28.2	28.2	28.0	28.7	27.7	27.5
31	5	69	6.8	12.7	23.6	27.7	28.6	28.4	28.6	27.8
8	6	69	4.6	14.6	16.4	20.6	18.6	17.1	18.6	26.3
12	6	69	12.5	9.4	13.4	27.7	27.7	31.6	28.2	29.7
21	6	69	9.8	10.3	17.0	24.3	29.6	27.6	28.6	26.1
28	6	69	5.1	13.8	10.0	11.6	26.8	25.5	28.4	25.9
7	7	69	8.5	11.1	12.0	15.2	23.2	25.3	25.3	25.4

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Eight, in Open Area 300 Feet East of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
12	7	69	8.5	16.1	18.8	18.2	24.0	25.5	24.7	24.5
19	7	69	26.6	16.2	18.8	15.2	22.0	24.5	24.7	25.5
26	7	69	21.3	17.4	17.9	23.0	27.7	27.5	27.9	26.6
2	8	69	21.2	23.6	20.4	25.0	29.1	26.1	29.7	28.4
9	8	69	17.8	16.0	13.4	16.0	16.9	19.0	19.3	19,9
16	8	69	16.3	14.0	10.4	13.5	24.3	23.9	26.5	24.3
23	8	69	15.8	15.3	17.2	19.0	24.0	25.1	25.2	23.1
29	8	69	16.4	13.8	17.5	25.0	28.5	30.2	28.4	26.4
4	9	69	15.9	13.5	15.6	13.3	19.3	20.0	25.1	26.0
12	9	69	20.2	17.7	11.2	17.0	26.4	29.4	28.3	25.0
19	9	69	16.2	16.3	17.7	20.5	25.9	27.9	30.0	28.7
26	9	69	10.0	11.1	12.9	16.6	23.1	24.2	24.0	23.4
4	10	69	8.2	10.8	10.3	18.1	24.2	24.3	23.4	23.6
11	10	69	8.8	13.0	22.6	22.2	25.1	24.8	25.3	24.9
18	10	69	6.3	11.9	15.2	16.6	20.1	23.1	22.3	22.1
25	10	69	22.7	12.8	12.0	18.5	21.6	25.8	25.3	23.4
1	11	69	18.9	18.3	17.7	23.3	26.7	27.1	27.2	25.2
8	11	69	17.6	14.5	10.3	16.5	20.8	23.0	40.9	7.4
15	11	69	26.9	26.3	24.4	17.1	22.2	23.7	27.8	27.3
22	11	69	26.0	26.9	21.3	26.2	19.5	22.4	25.6	22.4

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Eight, in Open Area 300 Feet East of Weather Station in the Central Meadow of Peterson Ranch.

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
29	11	69	26.7	25.5	24.5	26.6	21.1	21.3	23.7	23.1
6	12	69	29.6	29.7	25.3	24.0	21.9	25.1	26.6	26.3
13	12	69	27.5	29.9	27.5	26.9	25.7	25.4	27.7	28.1
20	12	69	27.8	26.7	23.9	26.6	21.5	21.7	22.1	24.7
27	12	69	28.0	28.7	25.1	26.0	26.2	25.4	27.4	26.8
3	1	70	30.5	26.8	26.1	25.4	28.0	29.2	26.5	27.9
10	1	70	42.4	29.4	24.2	20.3	27.9	27.5	24.2	25.0
17	1	70	46.0	32.1	20.5	20.9	24.8	25.9	27.3	26.1
24	1	70	39.3	33.5	28.5	22.3	28.3	28.0	28.8	28.7
31	1	70	30.5	30.7	53.6	30.2	32.7	32.4	31.0	29.2
7	2	70	26.5	28.2	26.5	28.2	30.8	34.1	32.5	29.3
14	2	70	29.3	28.8	32.0	32.1	31.6	31.6	29.3	26.8
28	2	70	29.0	29.9	27.0	24.9	29.3	30.0	30.6	29.0
14	3	70	34.9	33.0	31.4	27.9	30.6	34.0	31.9	31.1
28	3	70	24.0	26.4	26.0	27.5	29.6	31.5	32.9	30.9
11	4	70	24.0	26.7	25.8	28.7	28.8	31.8	32.0	29.1
25	4	70	26.2	27.8	23.7	25.8	29.0	31.8	31.9	29.9
9	5	70	19.8	23.0	22.4	22.3	30.6	31.1	32.3	29.4

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Nine, in Dense Forest Stand One-Quarter Mile North of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
3	11	67	18.2	17.1	16.5	19.5	19.1			
10	11	67	24.4	26.3	15.2	13.1				
17	11	67	14.9	12.8	17.8					
24	11	67	11.5	15.5		15.1	16.0	16.5	18.8	
1	12	67	17.4	21.1	24.1	20.5				
8	12	67	38.6	30.7	19.1	21.3				
27	12	67	34.8							
5	1	68	29.8	26.3	21.7	22.9				
12	1	68	32.6	34.4	33.8	33.6				
19	1	68	32.7	29.3	24.7	25.4				
26	1	68	53.7	46.9		43.1				
2	2	68	41.4	36.2	40.2					
16	2	68	37.0	40.2	36.3	42.1				
23	2	68	38.5	36.0	29.9					
15	3	68	34.2	33.8	26.4					
22	3	68	48.2	47.4	42.4	30.6				
5	4	68	33.8	34.3	30.9	30.9				
12	4	68	30.9	44.4	41.6	44.8				
19	4	68	68.3	29.9	26.9	30.3				
26	4	68	30.2	24.7	20.6	27.0				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Nine, in Dense Forest Stand One-Quarter Mile North of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
4	5	68	40.0	25.3	26.9	26.2				
11	5	68	38.2	22.8	25.7	23.1				
18	5	68	23.1	19.3	23.7	23.9				
25	5	68	22.9	19.7	18.9	21.7				
1	6	68	22.7	16.2	16.1	21.4				
7	6	68	15.1	15.4	13.1	10.8				
14	6	68	12.0	11.8	24.1	26.4				
21	6	68	14.0	14.1	17.1	15.8				
28	6	68	15.8	10.3	14.7	14.6				
5	7	68	12.8	14.7	12.4	14.9				
12	7	68	20.0	19.2	18.9	26.0				
19	7	68	18.0	14.3	17.5	20.0				
26	7	68	37.0	27.3	30.4	32.9				
2	8	68	56.1	25.8	36.7	22.9				
9	8	68	35.2	30.1	24.5	26.7				
16	8	68	33.3	28.3	26.2	27.9				
23	8	68	26.3	21.6	20.5	19.6				
29	8	68	31.0	25.5	24.5	25.0				
6	9	68	21.3	25.0	19.7	15.9				
13	9	68	20.2	24.7	20.4	22.8				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Nine, in Dense Forest Stand One-Quarter Mile North of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
20	9	68	14.9	17.1	17.4	19.8				
27	9	68	15.6	14.9	18.5	16.7				
4	10	68	27.5	23.0	13.9	15.3				
12	10	68	22.4	20.6	22.2	22.5				
19	10	68	19.3	19.0	21.3	24.6				
26	10	68	15.6	15.1	18.3	15.4				
1	11	68	20.3	16.9	18.8	19.4				
9	11	68	17.7	16.2	18.4	20.4				
16	11	68	36.1	34.6	32.2	28.6				
22	11	68	37.5	25.0	25.8	23.1				
30	11	68	35.7	30.4	25.8	25.0				
7	12	68	36.4	33.3	26.9	25.0				
14	12	68	38.9	25.9	29.1	24.7				
27	12	68	36.8	34.0	35.5	34.9				
10	1	69	46.6	36.5	30.3	26.2				
17	1	69	40.0	32.1	28.0	25.9	25.7			
24	1	69	44.1	33.3	30.7	32.6				
31	1	69	41.6	36.9	29.7	29.2				
7	2	69	39.3	32.5	31.3	33.3				
14	2	69	37.1	37.8	50.6	53.0				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Nine, in Dense Forest Stand One-Quarter Mile North of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
21	2	69	45.3	38.1	31.3	35.7				
28	2	69	42.9	16.4	29.9	26.6				
7	3	69	38.6	32.9	28.9	26.7				
14	3	69	40.9	34.8	33.3	27.9	20.6			
21	3	69	40.0	42.7	48.4	45.5				
28	3	69	44.1	37.5	37.5	35.1	31.5			
3	4	69	44.0	28.7	30.8	26.7				
11	4	69	31.6	24.2	22.0	20.2	18.3			
18	4	69	35.4	24.2	38.0	29.9				
26	4	69	20.0	20.3	21.5	20.0				
3	5	69	24.4	20.3	16.7	18.5	20.6			
10	5	69	30.4	27.1	25.0	26.8	25.3			
17	5	69	22.7	26.9	17.8	19.0				
24	5	69	15.6	20.4	20.0	16.4				
31	5	69	14.9	16.3	17.7	15.9	16.8			
8	6	69	14.3	14.7	13.2	16.1				
12	6	69	18.4	15.1	13.6	13.2				
21	6	69	14.9		13.7	13.9				
28	6	69	11.6	13.2	14.3	17.2				
7	7	69	16.4	13.5	12.4	14.3				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Nine, in Dense Forest Stand One-Quarter Mile North of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters 0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
12	7	69	13.0	12.6	16.5	15.6				
19	7	69	42.1	38.2	25.0	29.0				
26	7	69	34.4	24.4	21.8	21.4				
2	8	69	23.2	14.0	15.3	18.3	34.1			
9	8	69	26.1	22.3	22.6	17.1				
16	8	69	22.5	15.4	18.8	18.2	17.7			
23	8	69	16.8	19.7	18.8	16.4				
29	8	69	24.6	6.4	20.4	19.4				
4	9	69	14.5	15.4	16.6	16.2				
12	9	69	21.7	16.3	15.3					
19	9	69	24.9	30.6	35.3	37.1	34.8	31.9		
29	9	69	12.8	16.0	33.9	33.2	32.9			
4	10	69	13.6	29.1	33.0	29.1	28.5			
11	10	69	19.9	31.3	37.1	30.9	32.5			
18	10	69	16.6	30.0	32.9	28.8	27.0			
25	10	69	40.3	39.9	40.8	34.2				
1	11	69	42.7	38.4	43.4	42.0				
8	11	69	36.9	38.8	35.3	32.0	32.7			
15	11	69	43.8	44.1	43.5	37.3	34.6			
22	11	69	42.6	44.1	46.2	43.4				

Table 12 Percentage Moisture in Sierra Ancha Soil Samples at Various Depths--Sample Site Nine, in Dense Forest Stand One-Quarter Mile North of Weather Station in the Central Meadow of Peterson Ranch

Day	Month	Year	Depth of Soil Sample in Centimeters							
			0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120
29	11	69	42.5	42.5	42.1	40.1	39.6			
6	12	69	46.8	44.6	52.4	47.8				
13	12	69	44.8	45.8	39.2	36.6				
20	12	69	44.9	42.3	44.5	38.4				
27	12	69	42.6	45.3	37.6	45.9				
3	1	70	44.1	45.2	45.5	34.5				
10	1	70	45.2	48.4	44.9	45.6				
17	1	70	62.2	53.8	56.9	48.4				
24	1	70	44.3	47.5	47.6	40.1	39.6			
31	1	70	47.4	50.6	39.9	37.9				
7	2	70	45.5	44.6	55.1	37.4				
14	2	70	46.4	44.0	43.9	41.2	34.3			
28	2	70	52.8	46.3	49.6	46.8				
14	3	70	52.0	46.6	51.6	45.4				
28	3	70	50.3	52.1	46.0	44.7	37.5			
11	4	70	43.0	46.6	42.0	42.2				
25	5	70	51.3	51.5	46.6	41.9				
9	5	70	46.1	42.0	42.0	38.2	26.3			

Table 13. Nematode Species Found in Soils of the Sierra Ancha Experimental Forest.
* = Known plant parasite
** = Suspected plant parasite

Site No.	Depth cm	Species Found
1-NO	0 - 30	No specimens found.
2-NF	15 - 30	Helicotylenchus platyurus*, Tylenchus sp.,** Aphelenchus eremitus, Prionchulus muscorum, Plectus cirratus, Eucephalobus sp. Y.
3-NO	0 - 30	No specimens found.
4-NF	15 - 30	Acrobeloides minor.
5-NO	15 - 30	No specimens found.
6-NF	0 - 15	Hemicycliophora sp.*, Tylencholaimus proximus**, Eudorylaimus carteri, Nygolaimus brachyurus, Plectus cirratus, Eucephalobus oxyuroides.
1-MO	0 - 15	Tylenchorhynchus cylindricus*, Acrobeloides minor.
2-MF	0 - 15	Pratyclenchus brachyurus*, Helicotylenchus platyurus*, Tylenchus costatus, Nema sp. Y.
	15 - 30	Helicotylenchus pseudorobustus*, Tylenchus costatus*, Mylonchulus parabrachyurus.
3-MO	0 - 15	Helicotylenchus Y*, Dorylaimellus occidentalis**, Chiloplacus symmetricus, Acrobeloides minor.
4-MF	0 - 30	No specimens found.
5-MF	0 - 30	No specimens found.
6-MF	0 - 30	No specimens found.
1-SF	0 - 30	No specimens found.
2-SF	0 - 30	No specimens found.
3-SF	0 - 15	Xiphinema americanum*, Pungentus monhystra**, Acrobeloides minor.
4-SO	0 - 30	No specimens found.
5-SO	0 - 30	No specimens found.
WES5	0 - 15	Xiphinema americanum*, Tylencholaimus prosimus**, Axonchium sp.**, Acrobeles ctenocephalus.
WES7	0 - 15	Hemicycliophora sp.*, Axonchium sp.**, Alaimus acutus, Nygolaimus sp. Y.

DATA FROM WATERWAYS EXPERIMENT STATION

SAMPLE SITE PITS

TABLE 14. Analytical Data on Soils from Waterways Experiment Soil Sample Sites

Sample Site	Depth (cm)	pH			Bulk Density	Organic Matter %	Total Nitrogen %	Conductivity @ 25° C (ECx10^3) Millimhos/cm
		Tap H_2O	1N Kcl	Dist. H_2O				
3	0-15	6.98	5.70	7.55	1.98	0.54	0.022	0.36
	15-30	7.10	5.72	7.65	1.66	0.64	0.025	0.36
	30-45	7.15	5.71	7.70	1.84	0.68	0.032	0.31
	45-60	7.17	5.86	7.61	----	0.47	0.032	0.32
	60-75	7.12	5.62	7.69	----	0.38	0.023	0.27
	75-90	7.22	5.75	7.80	----	0.39	0.014	0.26
	90-105	7.08	5.50	7.68	----	0.34	0.012	0.25
4	0-15	6.65	5.78	6.60	1.75	3.70	0.078	0.35
	15-30	6.40	5.33	6.25	1.60	2.10	0.048	0.36
	30-45	6.32	5.11	6.29	1.58	1.90	0.051	0.21
	45-60	6.30	5.28	6.18	1.89	1.20	0.021	0.25
	60-75	6.30	5.30	6.30	----	0.35	0.021	0.28
5	0-15	7.10	4.85	7.36	1.64	0.40	0.030	0.23
	15-30	6.80	4.70	7.28	1.55	0.64	0.001	0.18
	30-45	6.95	4.70	7.28	1.59	0.29	0.004	0.19
	45-60	7.00	4.85	7.40	1.59	0.16	0.000	0.19
	60-75	7.00	4.78	7.40	1.59	0.25	0.000	0.14
	75-90	7.00	4.72	7.45	1.61	0.25	0.009	0.15
	90-105	7.00	4.71	7.47	1.69	0.20	0.009	0.15
	105-120	6.99	4.75	7.34	1.59	0.26	0.004	0.30
	120-135	6.98	4.63	7.47	1.53	0.30	-----	0.23
	135-150	7.04	4.45	7.45	1.40	0.22	-----	0.25
	150-165	7.10	4.68	7.44	1.45	0.11	-----	0.24
6	0-15	6.18	4.92	6.49	1.58	3.10	0.146	0.17
	15-30	5.97	4.50	6.27	1.48	2.20	0.115	0.23
	30-45	6.39	4.42	6.69	1.70	1.16	0.082	0.18
	45-60	6.30	4.15	6.47	1.76	0.98	0.057	0.23

TABLE 14. Continued. Analytical Data on Soils from Waterways Experiment Soil Sample Sites

Sample Site	Depth (cm)	pH			Bulk Density	Organic Matter %	Total Nitrogen %	Conductivity @ 25° C ($EC \times 10^3$) Millimhos/cm
		Tap H_2O	1N Kcl	Dist. H_2O				
6	60-75	6.36	4.18	6.51	1.72	0.66	0.037	0.15
	75-90	6.67	4.19	6.62	----	0.33	0.026	0.17
	90-105	6.73	4.32	6.75	----	0.17	0.037	0.20
	105-120	6.83	4.41	6.89	----	0.17	0.023	0.15
7	0-15	5.82	5.11	5.97	1.16	9.10	0.276	0.38
	15-30	5.63	4.70	5.69	1.27	5.60	0.189	0.36
	30-45	5.58	4.60	5.58	1.34	3.80	0.129	0.35
	45-60	5.74	4.65	5.64	1.52	2.90	0.112	0.40
8	0-15	6.27	5.30	6.41	1.48	5.10	0.105	0.45
	15-30	6.42	5.41	6.58	1.43	4.50	0.124	0.37
	30-45	6.68	5.60	6.59	1.53	3.30	0.120	0.23
	45-60	6.70	5.61	6.82	1.46	2.40	0.116	0.20
	60-75	6.80	5.62	6.70	1.57	2.00	0.101	0.20
	75-90	6.75	5.62	6.79	1.60	2.50	0.084	0.25
	90-105	6.68	5.67	6.72	1.61	4.30	0.101	0.22
	105-120	6.71	5.70	6.68	1.77	4.30	0.101	0.40
	120-135	6.70	5.66	6.69	1.75	4.50	0.102	0.44
	135-150	6.71	5.70	6.70	1.69	4.30	0.116	0.35
	150-165	6.72	5.63	----	1.69	4.20	0.092	0.30
	165-180	6.76	5.62	----	1.76	3.60	0.080	0.29
	180-195	6.79	5.58	----	1.76	3.40	0.095	0.30
9	0-15	5.80	4.91	5.80	1.40	6.05	0.269	0.32
	15-30	6.14	4.97	6.03	1.43	3.90	0.137	0.27
	30-45	6.10	4.99	6.00	1.41	3.80	0.130	0.30
	45-60	6.01	4.86	5.87	1.76	3.80	0.105	0.23
	60-75	6.00	4.82	5.85	1.81	3.08	0.082	0.24

TABLE 15. Particle Size Analysis and Percentage Dispersion of Soils from Waterways Experiment Soil Sample Sites

Sample Site	Depth (cm)	Particle Size Analysis				Percent Dispersion	Pore Space %
		Sand %	Silt %	Clay %	Texture Grade		
3	0-15	67.50	16.05	16.45	Stoney sandy loam	59.0	25
	15-30	62.29	17.14	20.57	Stoney sandy clay loam	52.8	37
	30-45	66.43	13.60	19.97	Stoney sandy loam	53.2	31
	45-60	66.26	15.15	18.59	Stoney sandy loam	44.2	--
	60-75	69.54	12.02	18.44	Stoney sandy loam	58.5	--
	75-90	74.41	9.07	16.52	Stoney sandy loam	62.3	--
	90-105	72.49	11.04	16.47	Stoney sandy loam	43.9	--
4	0-15	34.39	47.88	17.73	Stoney loam	50.9	33
	15-30	30.14	42.65	27.21	Stoney clay loam	46.1	40
	30-45	24.57	36.80	38.63	Stoney clay loam	45.0	40
	45-60	17.95	24.99	57.06	Stoney clay	34.0	29
	60-75	14.29	16.08	69.63	Stoney clay	41.8	--
5	0-15	89.46	5.58	4.96	Sand	52.0	38
	15-30	79.77	12.20	8.03	Loamy sand	63.1	42
	30-45	87.03	6.18	6.79	Loamy sand	53.5	40
	45-60	89.42	5.39	5.19	Sand	56.1	40
	60-75	92.01	3.54	4.45	Sand	87.3	40
	75-90	90.48	4.05	5.47	Sand	72.6	39
	90-105	91.44	3.06	5.50	Sand	80.2	36
	105-120	87.90	6.10	6.00	Sand	32.1	40
	120-135	85.27	7.67	7.06	Loamy sand	50.6	42
	135-150	87.72	6.71	5.57	Loamy sand	48.3	47
	150-165	92.40	3.29	4.31	Sand	24.5	45
6	0-15	73.15	18.03	8.82	Stoney sandy loam	54.5	40
	15-30	69.11	16.05	14.84	Stoney sandy loam	45.6	41
	30-45	70.39	15.71	13.90	Stoney sandy loam	57.8	36
	45-60	65.88	18.17	15.95	Stoney sandy loam	48.5	34

TABLE 15. Continued. Particle Size Analysis and Percentage Dispersion of Soils from Waterways Experiment Soil Sample Sites

Sample Site	Depth (cm)	Particle Size Analysis				Percent Dispersion	Pore Space %
		Sand %	Silt %	Clay %	Texture Grade		
6	60-75	78.16	9.01	12.83	Stoney sandy loam	43.1	35
	75-90	88.06	4.52	7.42	Stoney loamy sand	37.0	--
	90-105	90.58	3.51	5.91	Stoney sand	46.8	--
	105-120	90.39	3.20	6.41	Stoney sand	59.2	--
7	0-15	33.60	38.00	28.40	Clay loam	28.0	56
	15-30	27.60	38.60	33.80	Clay loam	25.7	52
	30-45	32.60	32.60	34.80	Clay loam	24.8	49
	45-60	37.60	31.00	31.40	Clay loam	47.3	43
8	0-15	27.60	38.00	34.40	Clay loam	68.4	41
	15-30	24.60	38.00	37.40	Clay loam	40.9	52
	30-45	37.60	28.00	34.40	Clay loam	33.4	42
	45-60	47.60	20.00	32.40	Clay loam	39.9	45
	60-75	46.60	22.00	31.40	Sandy clay loam	33.9	41
	75-90	46.00	22.00	32.00	Sandy clay loam	45.0	40
	90-105	26.00	31.00	43.00	Sandy clay loam	32.1	39
	105-120	22.00	35.40	42.60	Sandy clay loam	35.8	32
	120-135	19.00	38.00	43.00	Clay	37.5	34
	135-150	17.00	35.60	47.40	Clay	44.8	36
	150-165	15.00	38.00	47.00	Clay	42.6	36
	165-180	14.00	37.00	49.00	Clay	44.6	32
	180-195	12.00	39.00	48.40	Clay	32.2	32
9	0-15	28.00	39.00	33.00	Clay loam	20.3	47
	15-30	28.00	37.80	34.20	Clay loam	24.4	52
	30-45	29.60	35.00	35.40	Clay loam	25.6	47
	45-60	23.20	35.00	41.80	Clay	40.8	32
	60-75	23.20	34.00	42.80	Clay	48.8	32

TABLE 16. Moisture Content of Soils from WES Sample Pits at 0 Atmosphere, 1/3 Atmosphere, and 15 Atmospheres Tension

Sample	Site #3			Site #4			Site #5			Site #6		
Depth (cm)	0 ATM	.3 ATM	15 ATM	0 ATM	.3 ATM	15 ATM	0 ATM	.3 ATM	15 ATM	0 ATM	.3 ATM	15 ATM
0-15	43.2	4.2	4.8	50.4	16.5	5.4	28.9	4.4	2.5	50.8	9.6	11.7
15-30	48.4	8.4	6.6	56.7	15.2	7.7	35.6	7.6	4.2	59.1	9.1	7.2
30-45	48.8	12.4	6.7	65.7	19.8	11.3	31.4	6.0	3.5	63.5	10.5	12.5
45-60	40.3	10.5	6.6	73.4	31.8	19.4	28.0	4.2	2.9	39.5	3.8	12.8
60-75	42.7	6.2	6.6	70.6	42.0	24.3	39.6	4.9	3.3	42.3	8.7	8.7
75-90	44.6	9.8	6.4	----	----	----	28.2	4.5	4.0	32.2	3.3	4.1
90-105	39.3	9.0	6.2	----	----	----	25.7	3.9	3.1	32.0	3.7	5.6
105-120	----	----	----	----	----	----	28.0	2.0	5.1	31.2	3.1	3.3
120-135	----	----	----	----	----	----	35.0	1.4	6.3	----	----	----
135-150	----	----	----	----	----	----	39.7	2.2	8.0	----	----	----
150-165	----	----	----	----	----	----	50.0	7.2	7.4	----	----	----

Sample	Site #7			Site #8			Site #9		
Depth (cm)	0 ATM	.3 ATM	15 ATM	0 ATM	.3 ATM	15 ATM	0 ATM	.3 ATM	15 ATM
0-15	101.4	23.9	17.5	67.0	21.0	11.2	90.6	28.2	12.8
15-30	85.3	17.9	11.8	76.0	23.4	15.6	67.6	17.1	9.4
30-45	65.0	25.3	9.7	63.8	15.2	11.2	89.6	25.6	10.5
45-60	53.8	11.5	8.5	54.4	13.3	12.6	68.8	34.2	12.7
60-75	----	----	----	54.4	12.5	10.3	63.3	35.5	12.5
75-90	----	----	----	61.8	21.3	11.3	----	----	----
90-105	----	----	----	80.5	22.3	14.5	----	----	----
105-120	----	----	----	83.0	20.0	14.9	----	----	----
120-135	----	----	----	76.7	25.0	15.4	----	----	----
135-150	----	----	----	76.0	25.0	16.9	----	----	----
150-165	----	----	----	66.3	26.2	18.4	----	----	----
165-180	----	----	----	56.5	21.3	14.5	----	----	----
180-195	----	----	----	56.1	20.7	15.4	----	----	----

TABLE 17. Infiltration Rates at WES Soil Sample Pits

	22 June 1967		7 June 1967		6 June 1967		21 June 1967	
Direction	Site #3		Site #4		*Site #5		Site #6	
from Stake	ml/cm^2/hr	inches/hr	ml/cm^2/hr	inches/hr	ml/cm^2/hr	inches/hr	ml/cm^2/hr	inches/hr
North	-----	-----	-----	-----	14.40	5.60	-----	-----
South	6.10	2.40	-----	-----	-----	-----	-----	-----
East	-----	-----	-----	-----	-----	-----	29.20	13.49
West	-----	-----	-----	-----	-----	-----	-----	-----
Northeast	4.75	1.87	6.85	2.65	-----	-----	8.70	3.40
Northwest	4.30	1.60	-----	-----	-----	-----	22.00	10.20
Southeast	-----	-----	4.22	1.66	20.00	7.90	-----	-----
Southwest	-----	-----	6.25	2.46	15.10	5.90	-----	-----

* Pit Bottom 15.6 6.16

	25 July 1967		18 July 1967		20 July 1967	
Direction	Site #7		*Site #8		Site #9	
from Stake	ml/cm^2/hr	inches/hr	ml/cm^2/hr	inches/hr	ml/cm^2/hr	inches/hr
North	-----	-----	1.23	0.48	22.00	8.68
South	----	-----	8.80	3.46	-----	-----
East	-----	-----	7.55	2.94	7.60	3.00
West	15.10	5.90	-----	-----	-----	-----
Northeast	-----	-----	-----	-----	-----	-----
Northwest	13.25	5.20	-----	-----	-----	-----
Southeast	-----	-----	-----	-----	-----	-----
Southwest	2.20	0.86	-----	-----	11.20	4.40

* Pit Bottom 0.51 0.02

TABLE 18. Wet and Dry Colors of Soil from WES Sample Pits at 15 cm. Increments of Depth.

		Dry		Moist	
Site Number	Depth (cm)	Munsell Notation	Color Name	Munsell Notation	Color Name
3	0-15	5YR 5/6	yellowish red	5YR 4/6	yellowish red
	15-30	5YR 5/6	yellowish red	5YR 4/6	yellowish red
	30-45	5YR 5/6	yellowish red	5YR 4/6	yellowish red
	45-60	5YR 5/6	yellowish red	5YR 4/6	yellowish red
	60-75	5YR 5/6	yellowish red	5YR 4/6	yellowish red
	75-90	5YR 5/6	yellowish red	5YR 4/6	yellowish red
	90-105	5YR 5/6	yellowish red	5YR 4/6	yellowish red
4	0-15	10YR 4/3	brown	10YR 3/3	dark brown
	15-30	7.5YR 4/4	dark brown	5YR 3/3	dark reddish brown
	30-45	5YR 4/4	reddish brown	5YR 3/4	reddish brown
	45-60	10YR 6/4	light yellowish brown	7.5YR 4/4	dark brown
	60-75	10YR 6/6	brownish yellow	10YR 4/4	dark yellowish brown
5	0-15	10YR 4/3	brown	10YR 3/3	dark brown
	15-30	10YR 4/3	brown	10YR 3/3	dark brown
	30-45	10YR 4/3	brown	10YR 3/3	dark brown
	45-60	10YR 4/3	brown	10YR 3/3	dark brown
	60-75	10YR 4/3	brown	10YR 3/3	dark brown
	75-90	10YR 4/3	brown	10YR 3/3	dark brown
	90-105	10YR 4/3	brown	10YR 3/3	dark brown
	105-120	10YR 4/3	brown	10YR 3/3	dark brown
	120-135	10YR 4/3	brown	10YR 4/4	dark yellowish brown

TABLE 18. Continued. Wet and Dry Colors of Soil from WES Sample Pits at 15 cm. Increments of Depth.

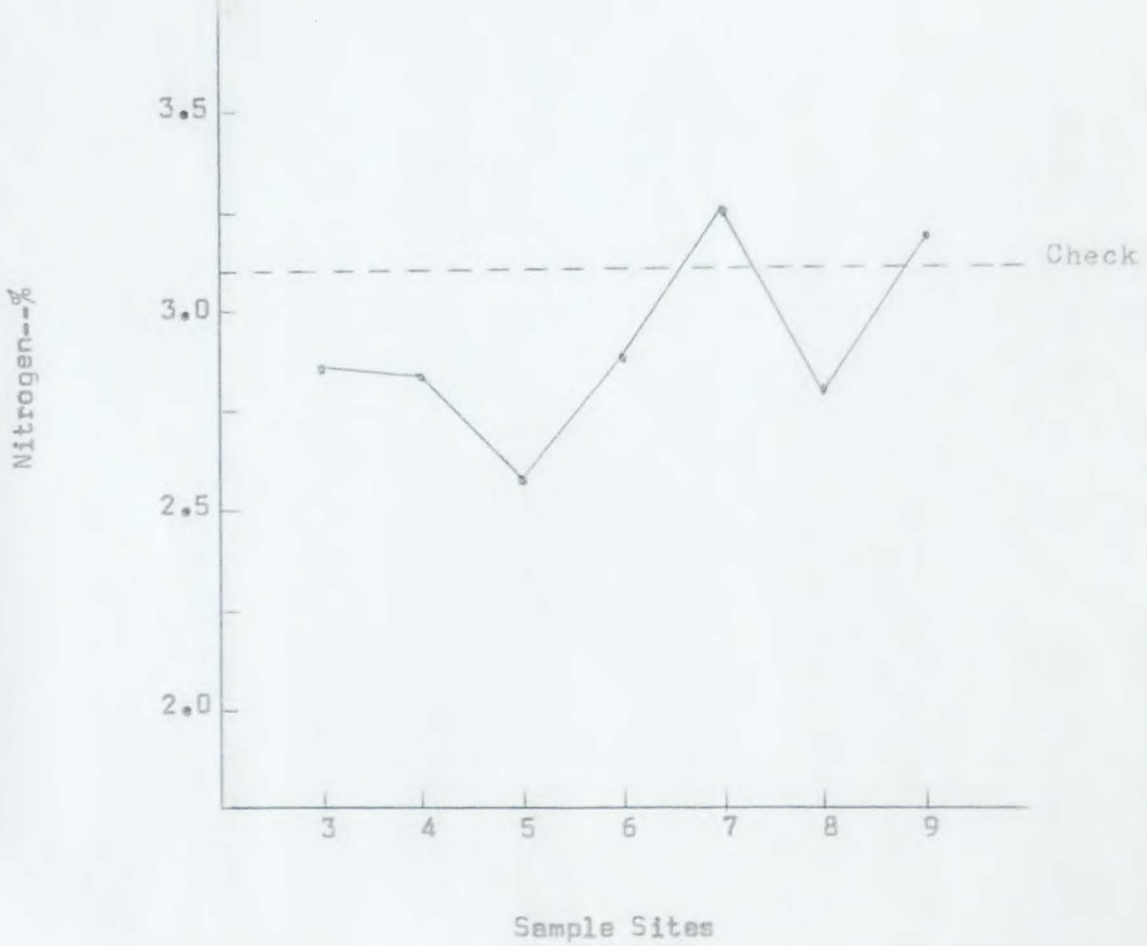
Site Number	Depth (cm)	Dry Munsell Notation	Dry Color Name	Moist Munsell Notation	Moist Color Name
6	0-15	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	15-30	2.5YR 3/2	dusky red	10YR 2/2	very dark brown
	30-45	10YR 4/3	brown	10YR 3/3	dark brown
	45-60	10YR 4/3	brown	10YR 3/3	dark brown
	60-75	10YR 4/3	brown	10YR 3/3	dark brown
	75-90	10YR 4/4	dark yellowish brown	10YR 3/4	dark yellowish brown
	90-105	10YR 4/4	dark yellowish brown	10YR 3/4	dark yellowish brown
	105-120	10YR 4/4	dark yellowish brown	10YR 3/4	dark yellowish brown
7	0-15	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	15-30	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	30-45	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	45-60	10YR 5/2	grayish brown	10YR 2/2	very dark brown
8	0-15	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	15-30	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	30-45	10YR 3/3	dark brown	10YR 2/2	very dark brown
	45-60	10YR 3/3	dark brown	10YR 2/2	very dark brown
	60-75	10YR 3/3	dark brown	10YR 2/2	very dark brown
	75-90	10YR 3/3	dark brown	10YR 2/2	very dark brown
	90-105	10YR 3/2	very dark grayish brown	10YR 2/2	very dark brown
	105-120	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	120-135	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
9	0-15	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	15-30	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	30-45	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	45-60	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown
	60-75	10YR 4/2	dark grayish brown	10YR 2/2	very dark brown

TABLE 19. Uptake of Nutrient Elements by Rye Seedlings from Soils of WES Sample Pits as Determined by Neubauer Method

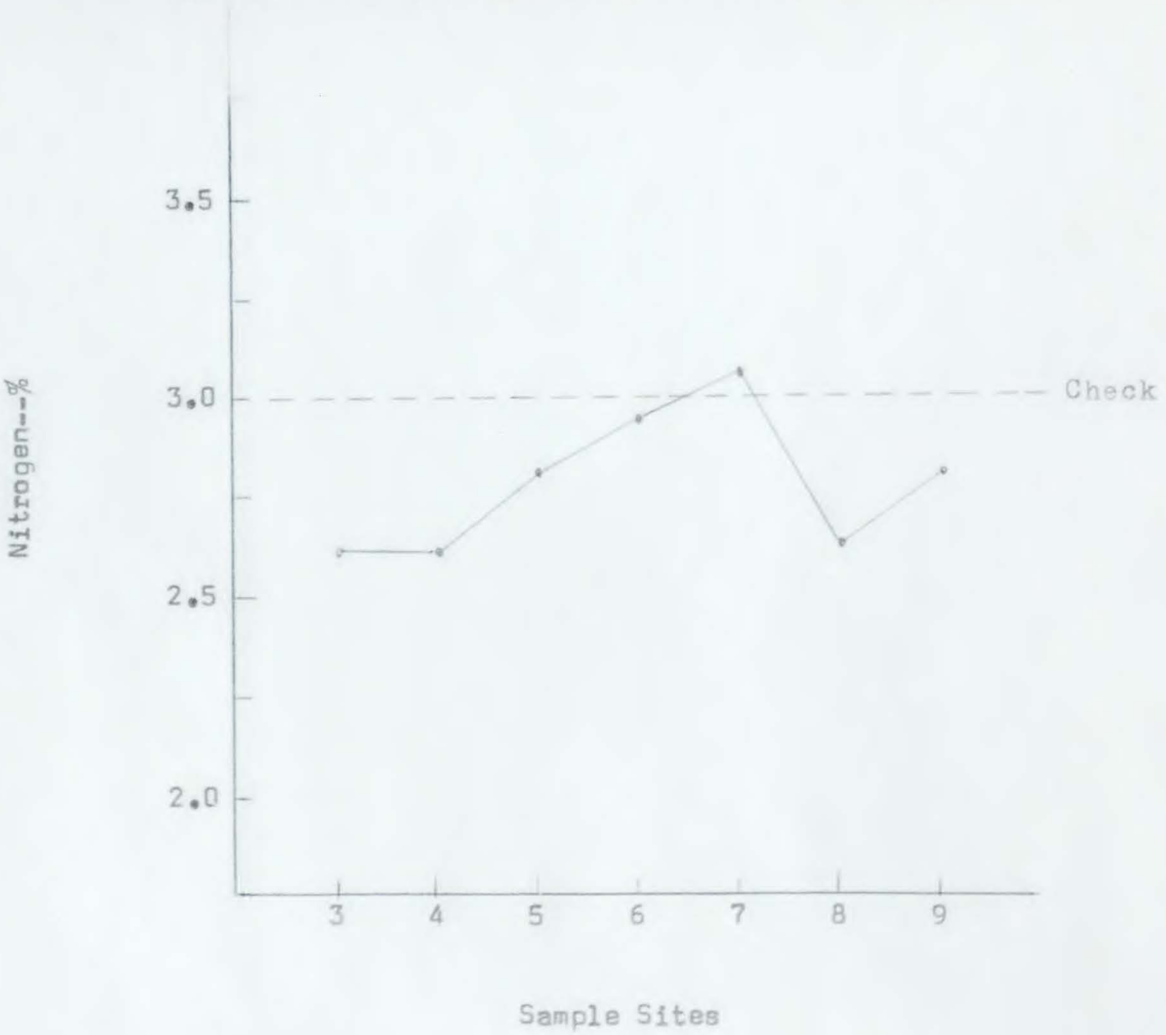
Site	Depth	%						PPM							
	(cm)	N	P	K	Ca	Mg	Na	Al	Ba	Fe	Sr	B	Cu	Zn	Mn
W3-1	0-15	2.85	0.94	2.55	0.64	0.39	0.16	+1000.	069.5	+1000.	036.3	12.50	052.0	116.5	207.5
W3-2	45-60	2.86	0.89	2.20	0.73	0.45	0.19	+1000.	070.5	+1000.	035.5	18.25	049.0	122.5	227.5
W3-3	90-105	2.69	0.87	1.90	0.64	0.44	0.18	+1000.	060.5	+1000.	039.9	12.95	042.5	109.5	167.5
W4-1	0-15	2.83	0.85	1.68	0.61	0.37	0.18	+1000.	061.5	+1000.	032.5	15.35	053.5	124.0	182.5
W4-2	30-45	2.61	0.82	2.55	0.61	0.38	0.13	+1000.	068.0	+1000.	034.3	14.85	049.0	108.0	154.5
W4-3	60-75	2.59	0.89	3.65	0.47	0.33	0.15	+1000.	052.5	+1000.	028.4	26.10	053.5	092.0	090.0
W5-1	0-15	2.58	0.92	2.20	0.62	0.53	0.18	+1000.	048.0	+1000.	044.0	24.60	032.9	079.5	305.0
W5-2	75-90	2.82	0.70	2.55	0.66	0.47	0.24	0965.	051.5	+1000.	053.5	06.95	041.5	087.0	207.5
W5-3	150-165	2.66	0.82	1.59	0.83	0.53	0.28	0995.	051.5	+1000.	062.5	12.10	034.1	085.5	141.5
W6-1	0-15	2.89	0.89	3.35	0.59	0.42	0.18	+1000.	071.5	+1000.	035.5	13.40	049.0	102.5	327.5
W6-2	45-60	2.95	0.80	3.00	0.68	0.38	0.21	0970.	068.0	+1000.	042.0	08.65	036.5	087.0	215.0
W6-3	105-120	2.75	0.82	2.20	0.71	0.45	0.29	0945.	060.5	+1000.	046.5	08.65	042.5	096.5	202.5
W7-1	0-15	3.25	0.94	3.10	0.68	0.34	0.10	+1000.	091.5	+1000.	046.5	07.85	037.5	106.0	244.5
W7-2	15-30	3.07	0.92	2.75	0.66	0.39	0.10	+1000.	090.5	+1000.	046.5	11.15	034.1	098.0	+1000.
W7-3	45-60	2.76	0.82	1.90	0.59	0.42	0.18	+1000.	072.5	+1000.	044.0	13.40	047.5	092.0	+1000.
W8-1	0-15	2.80	0.68	1.85	0.42	0.31	0.13	+1000.	055.0	+1000.	026.5	09.90	042.5	104.5	128.5
W8-2	75-90	2.64	0.72	2.55	0.48	0.35	0.18	+1000.	051.5	0910.	034.3	05.80	031.8	080.0	121.0
W8-3	180-195	2.65	0.77	2.90	0.54	0.39	0.13	+1000.	065.0	+1000.	039.1	11.15	032.9	081.0	217.5
W9-1	0-15	3.29	0.75	3.35	0.61	0.34	0.08	+1000.	101.0	+1000.	035.5	08.65	031.8	087.0	358.0
W9-2	30-45	2.82	0.68	3.75	0.55	0.31	0.17	+1000.	079.5	+1000.	034.3	09.05	047.5	071.5	392.0
W9-3	60-75	2.66	0.65	3.65	0.52	0.30	0.17	+1000.	074.0	+1000.	034.3	07.45	047.5	092.0	292.0

+ Refers to values larger than 1000 PPM.

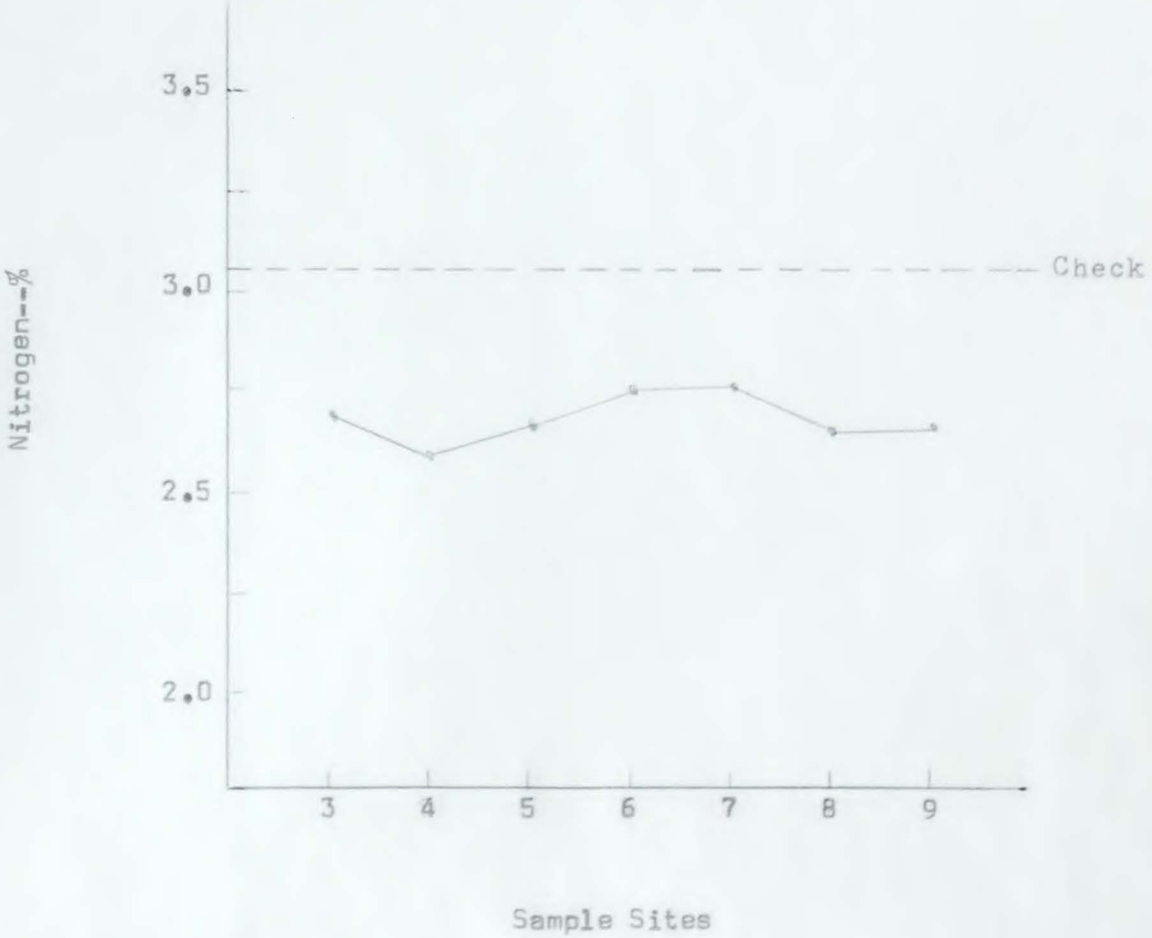
Nitrogen Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



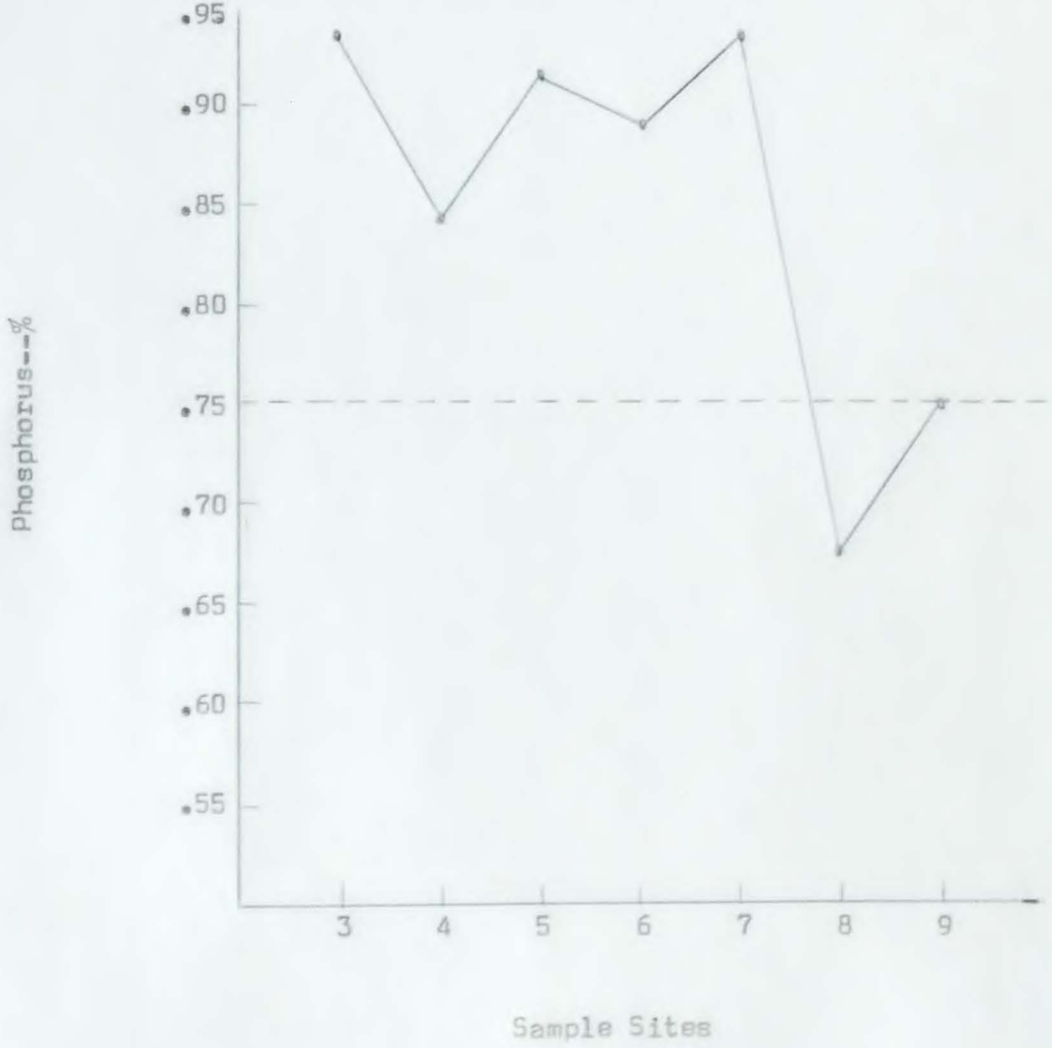
Nitrogen Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



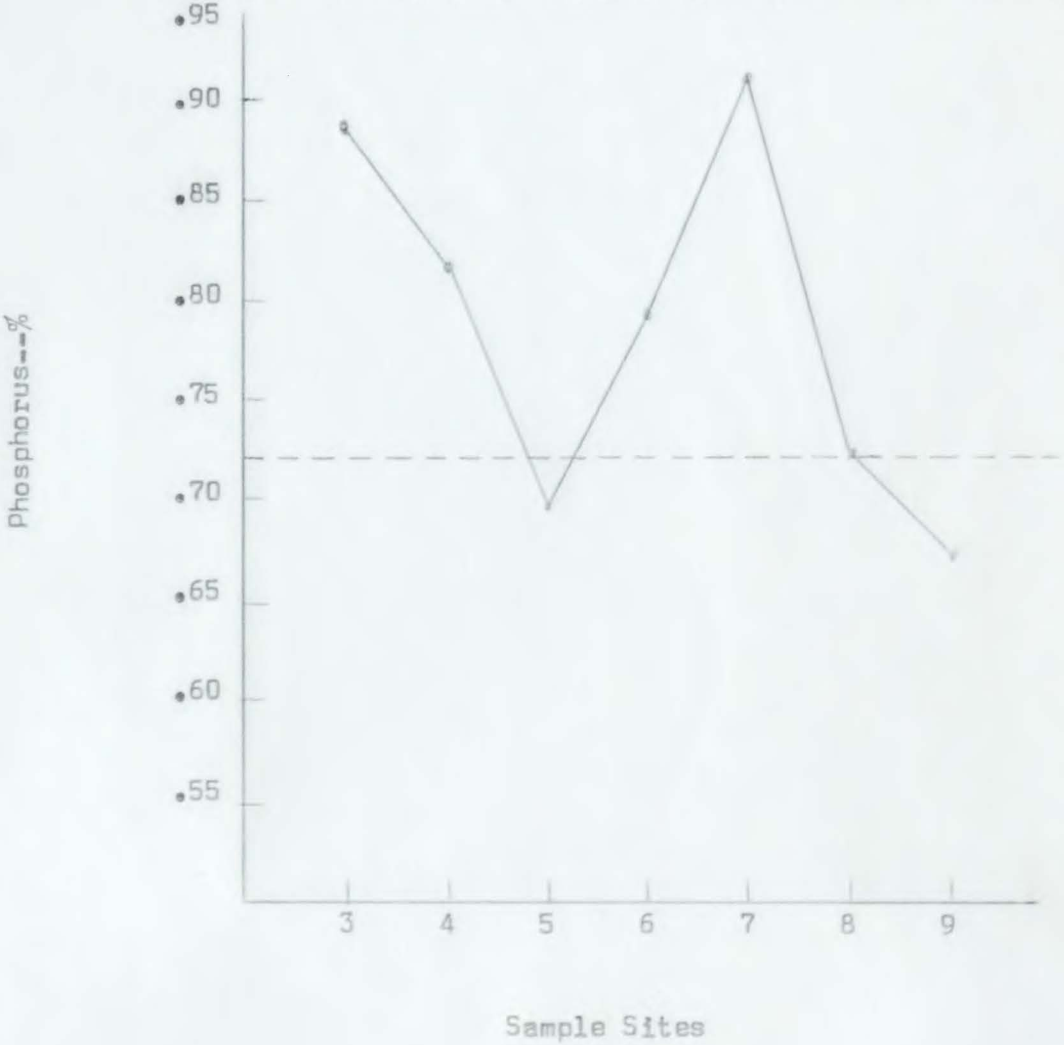
Nitrogen Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method

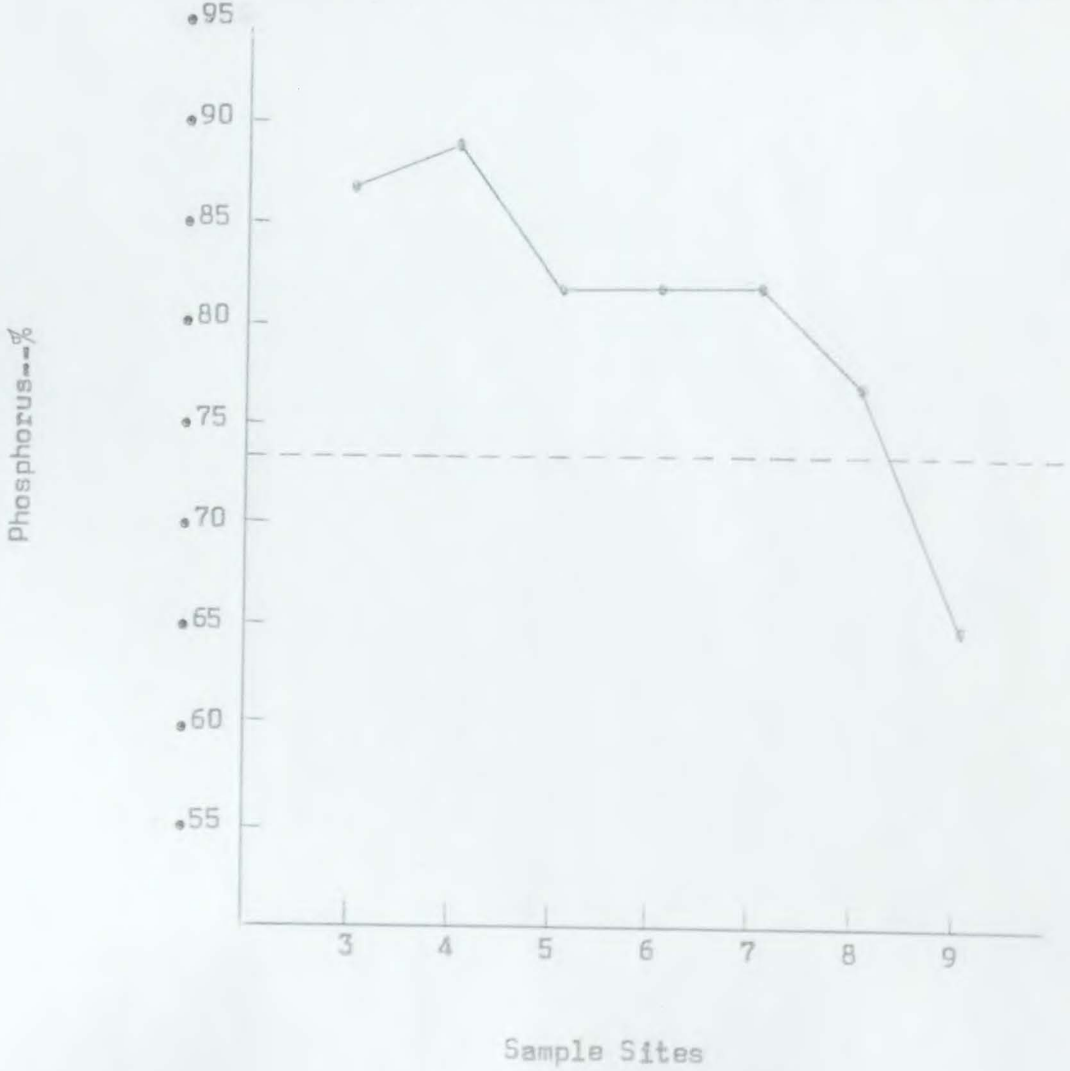


Phosphorus Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



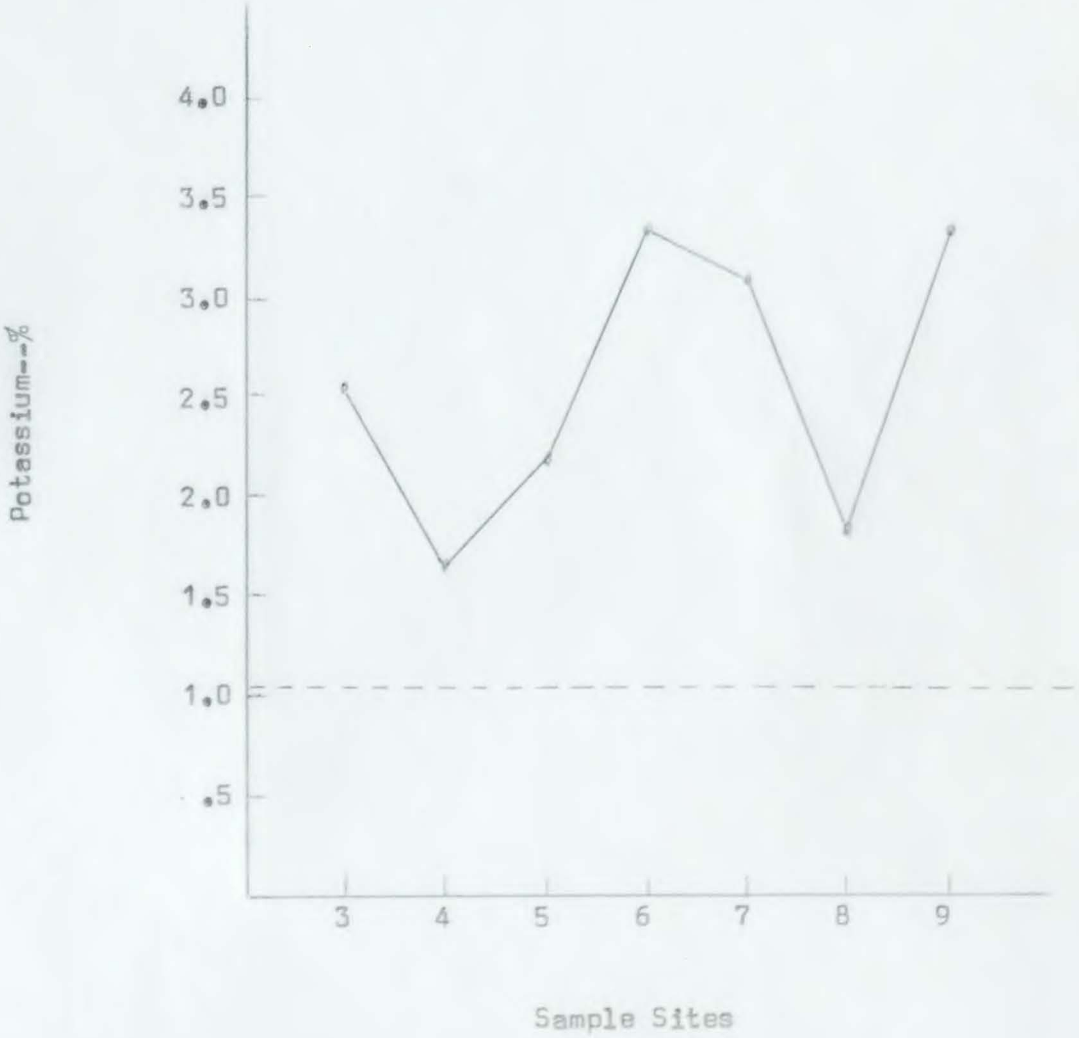
Phosphorus Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



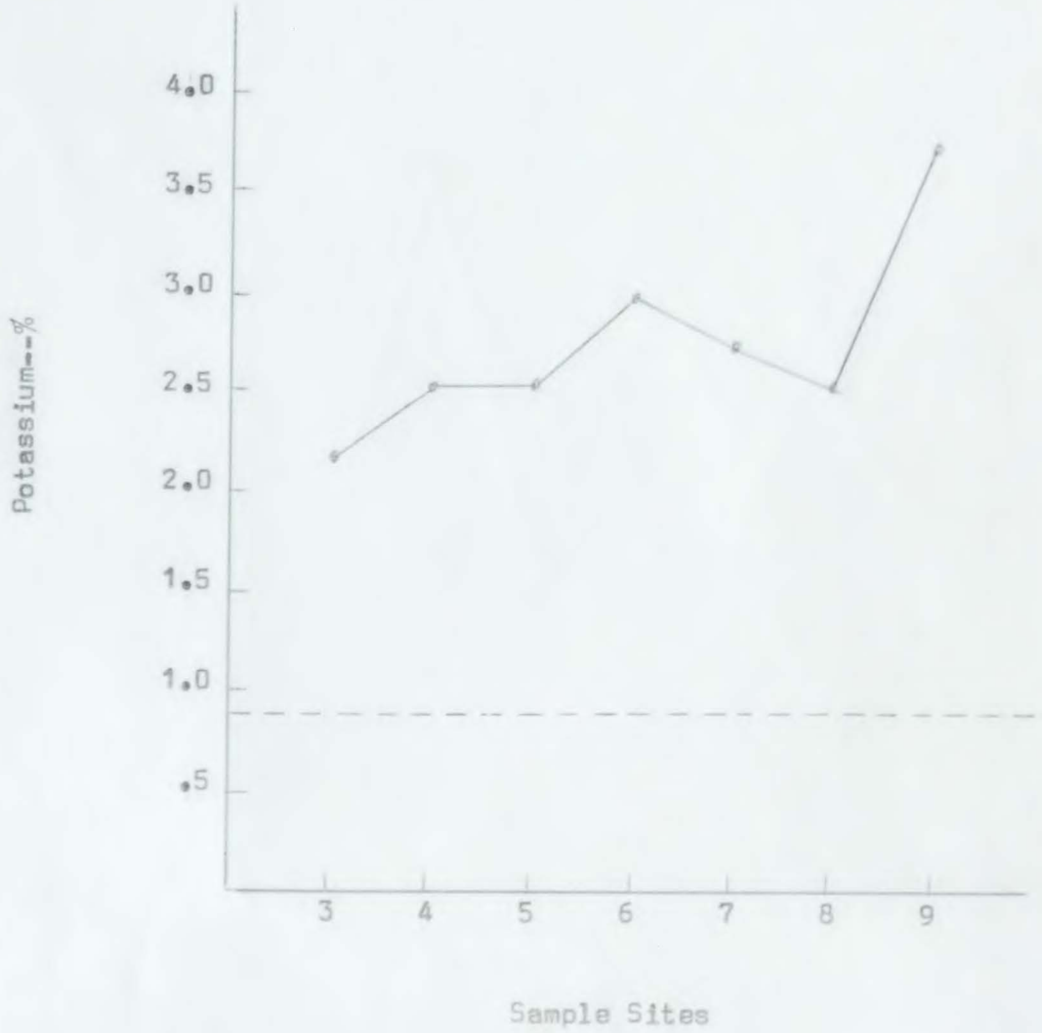


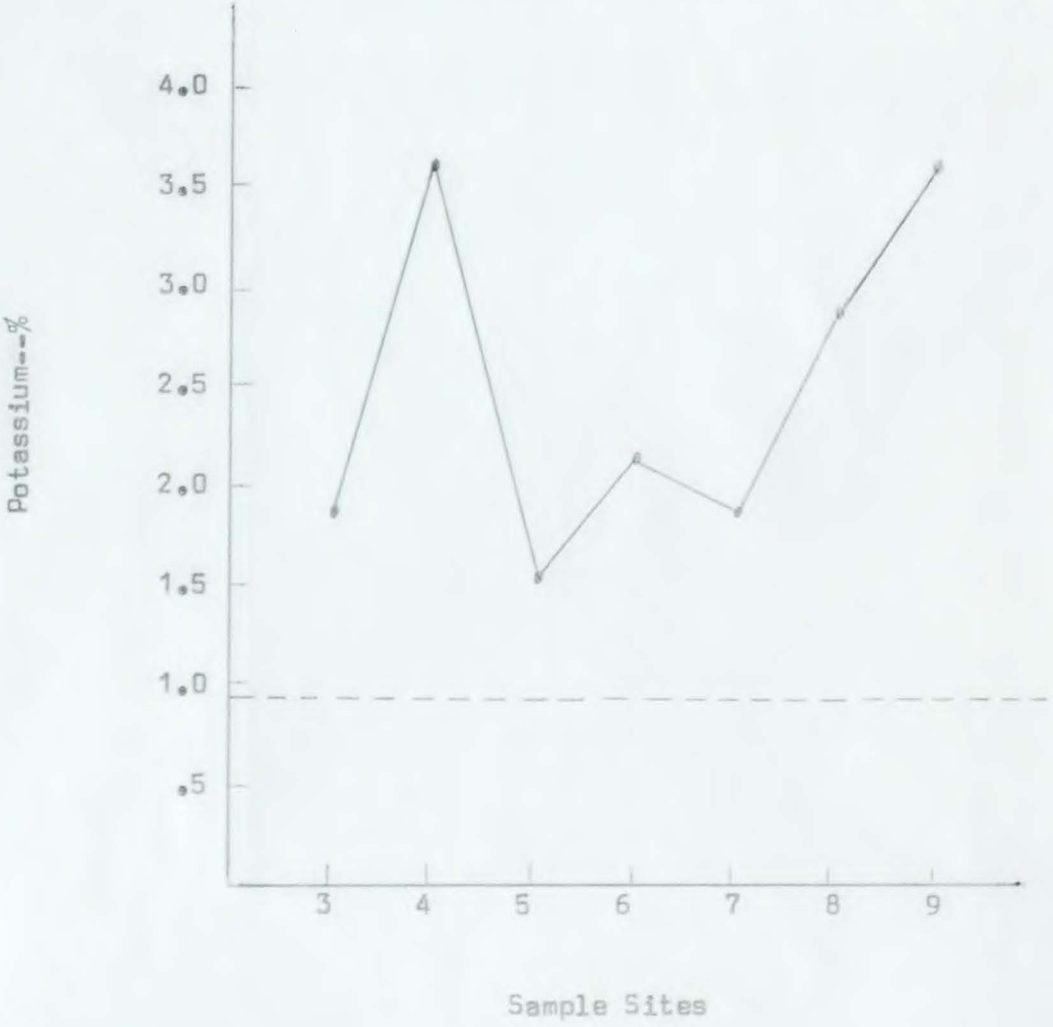
Phosphorus Uptake by Rye Seedlings from Bottom 15 cm. of WES Sample Pits by Neubauer Method

Potassium Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



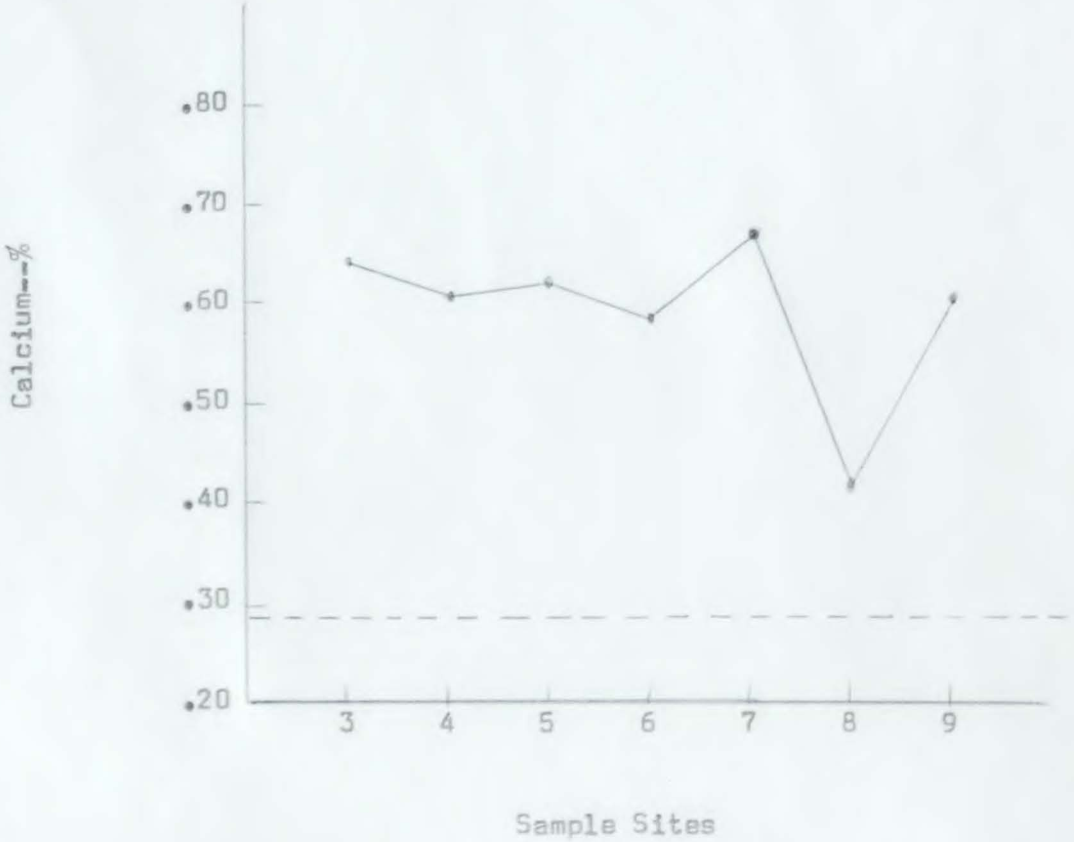
Potassium Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



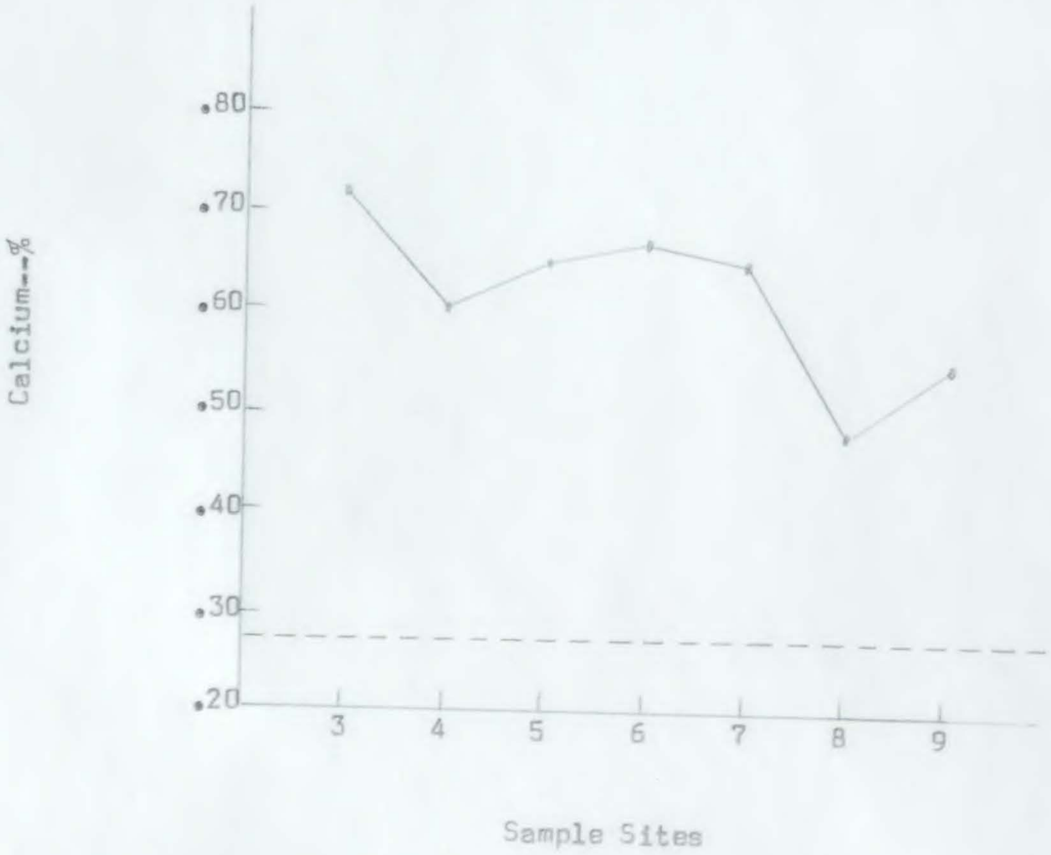


Potassium Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method

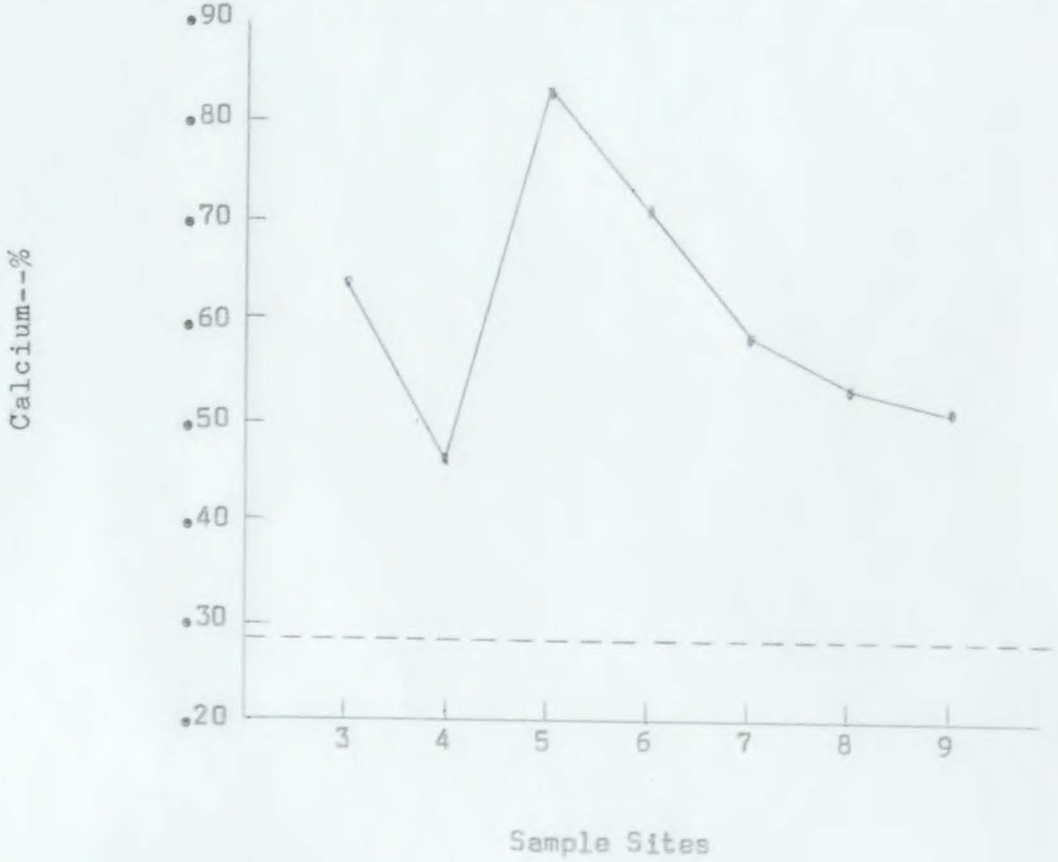
Calcium Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



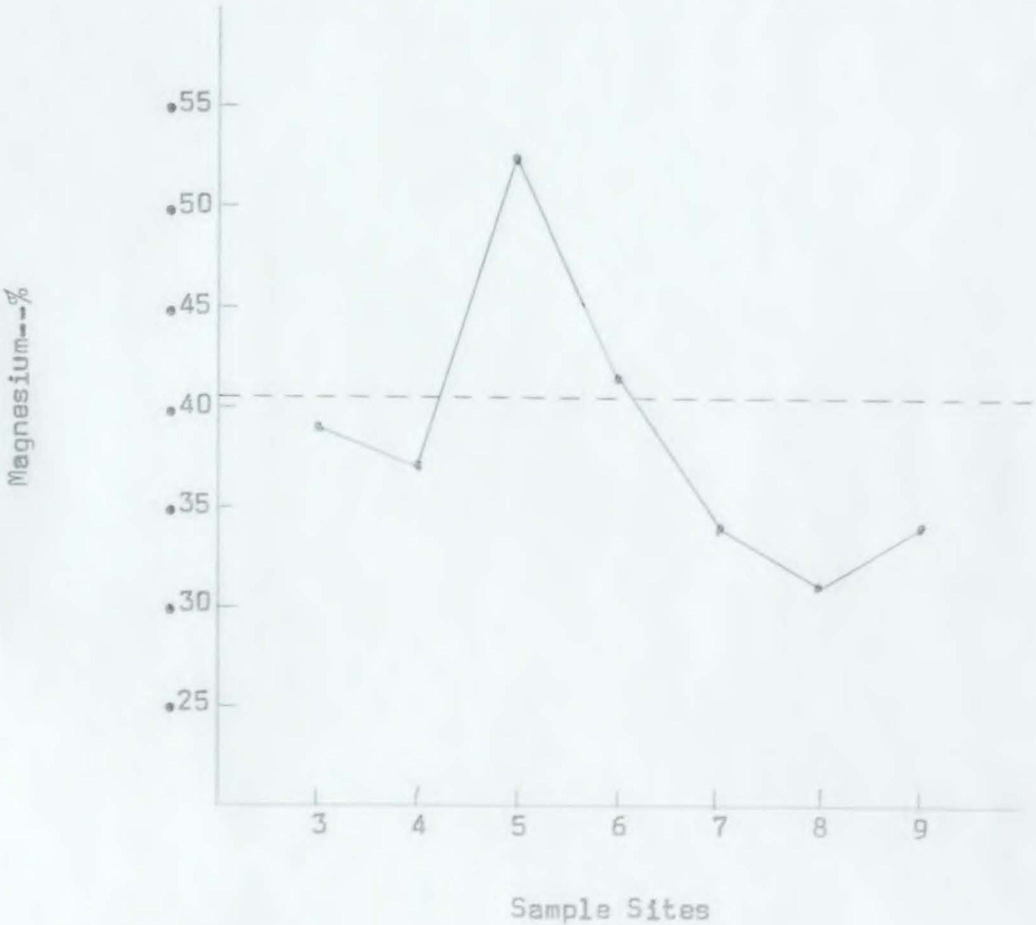
Calcium Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



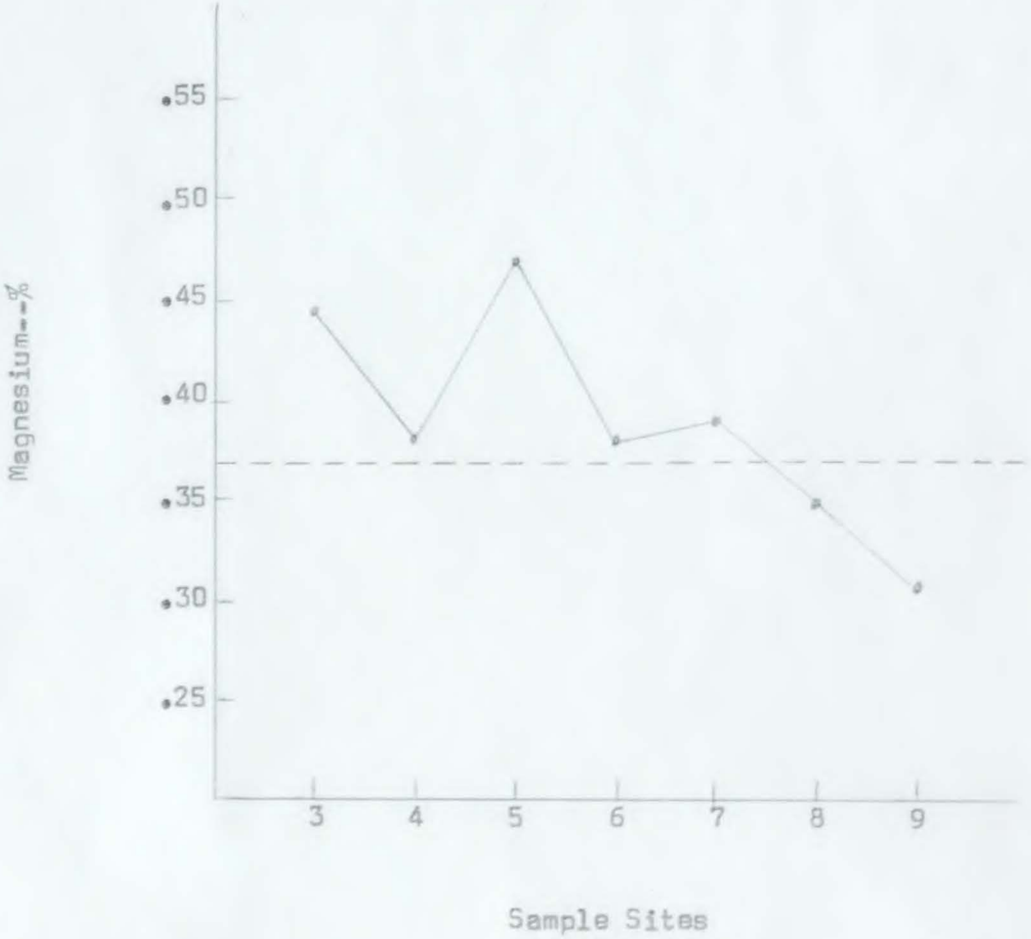
Calcium Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method



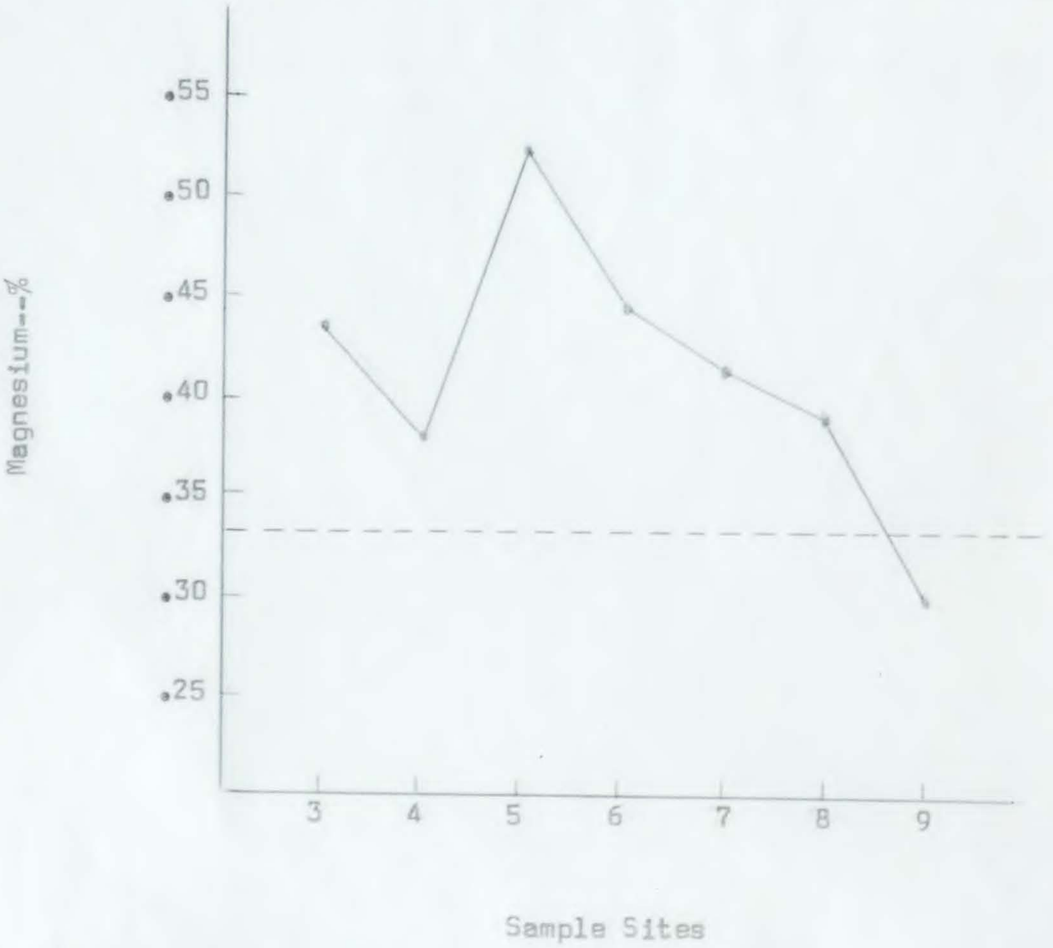
Magnesium Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method

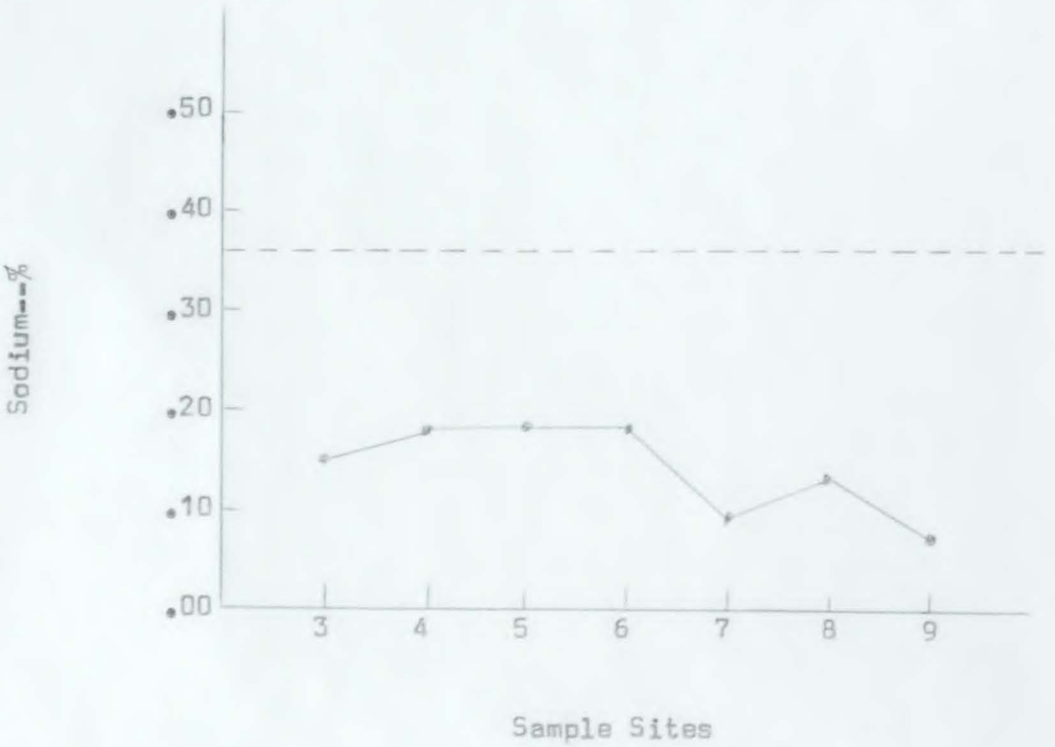


Magnesium Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



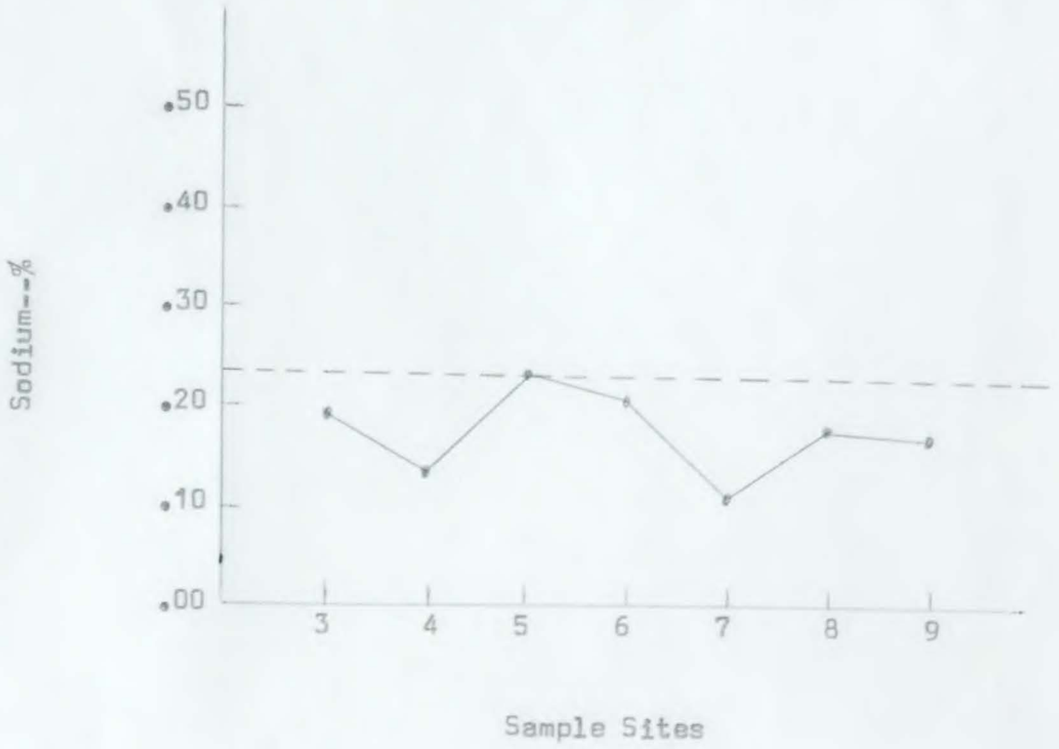
Magnesium Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method



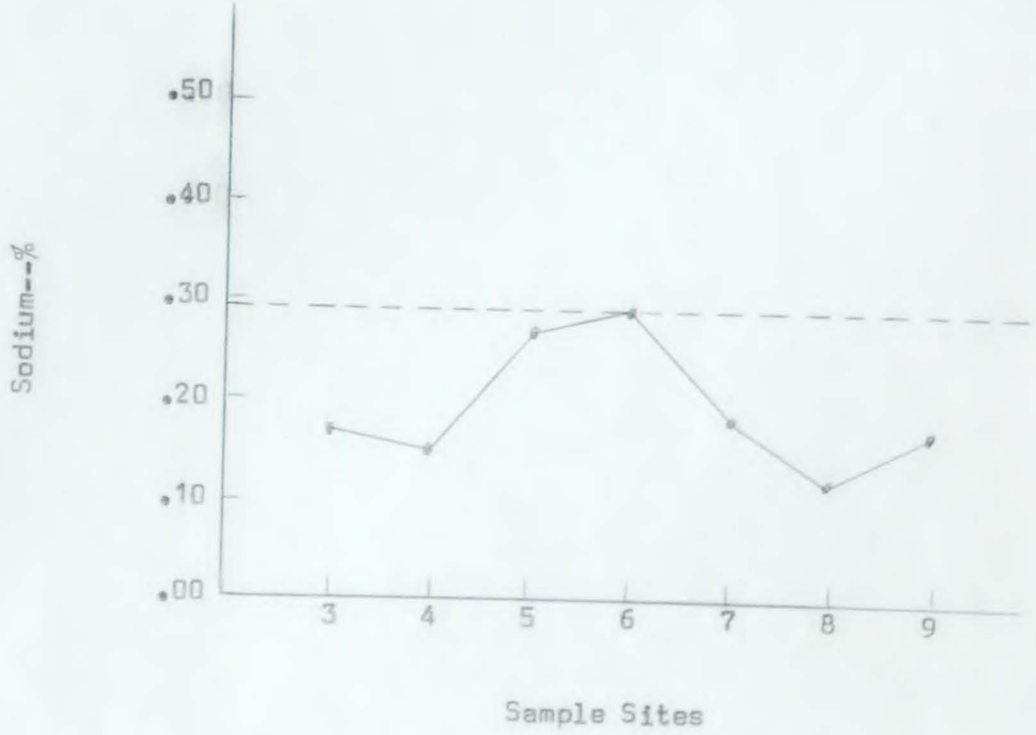


Sodium Uptake by Rye Seedlings from Surface 15 cm. of WES Sample Pits by Neubauer Method

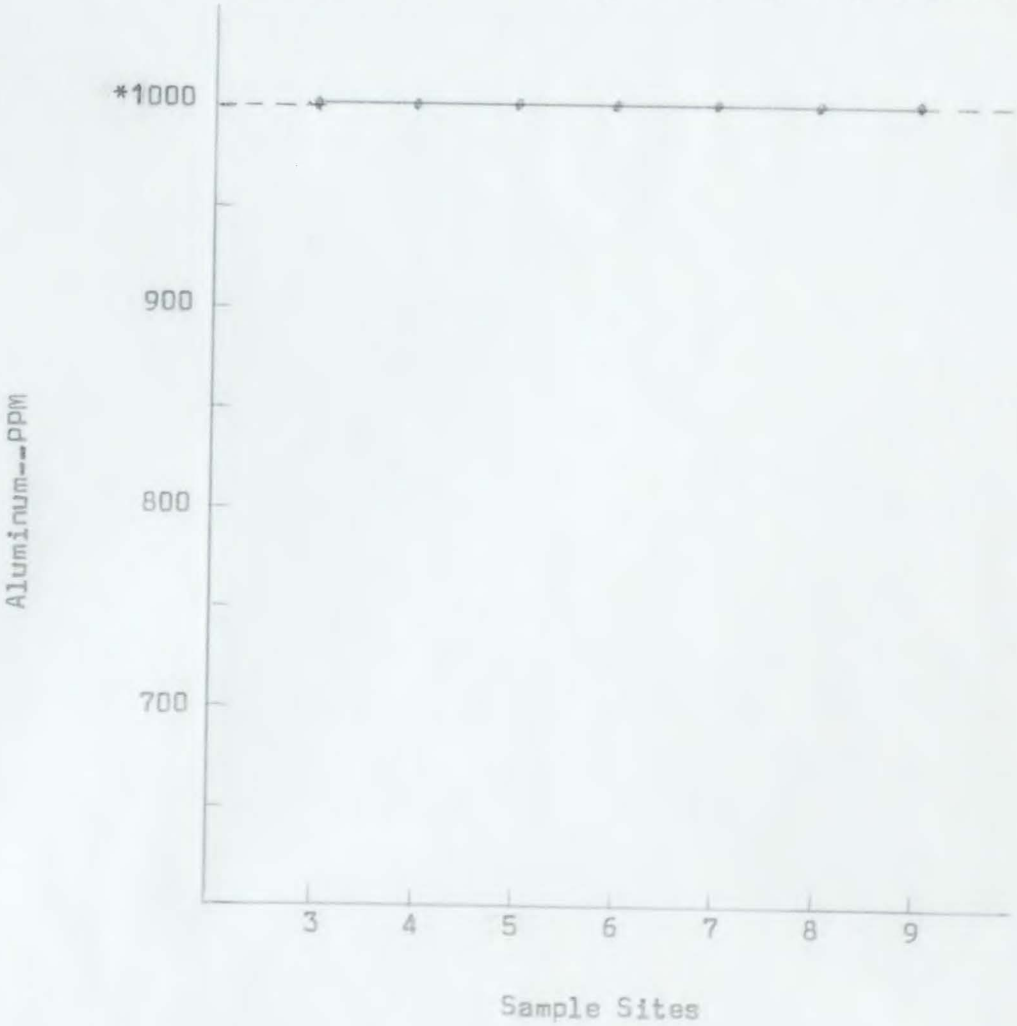
Sodium Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



Sodium Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method

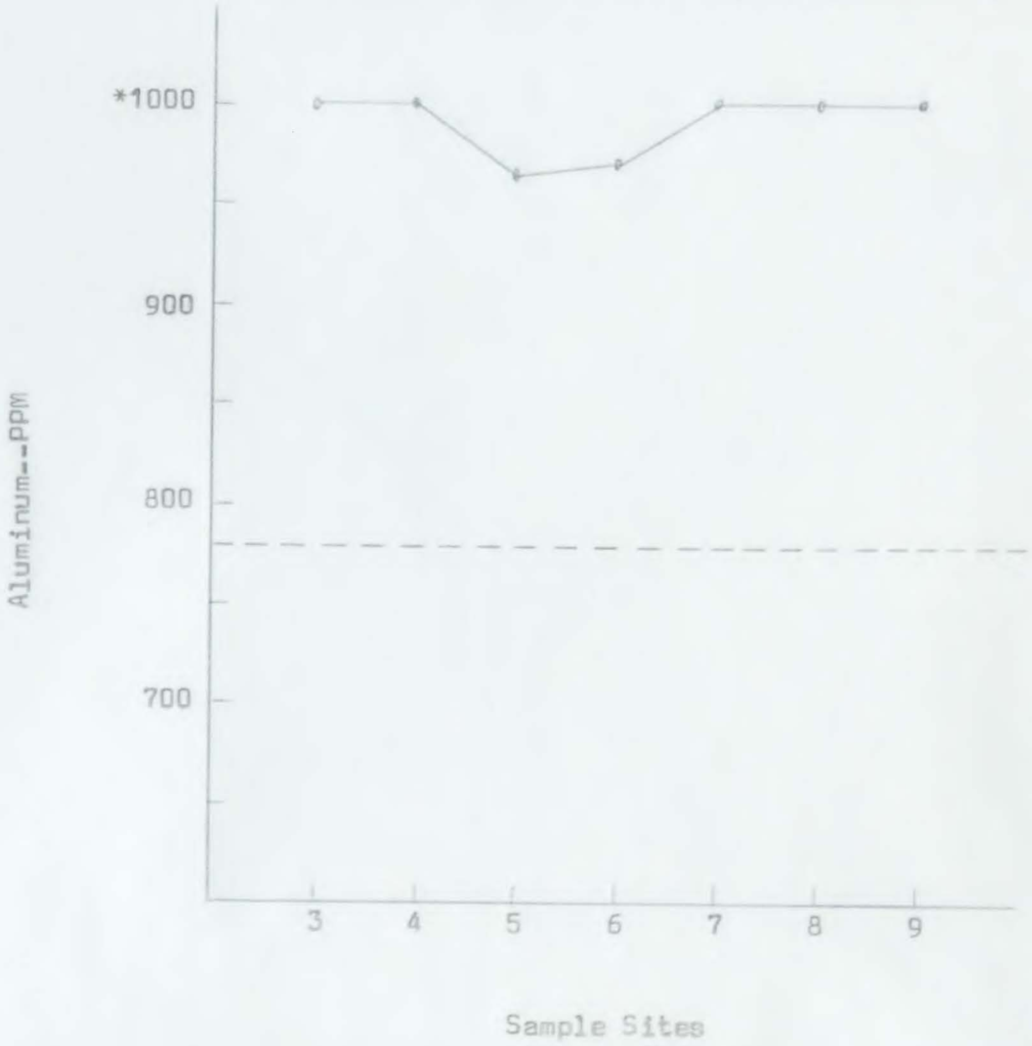


Aluminum Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



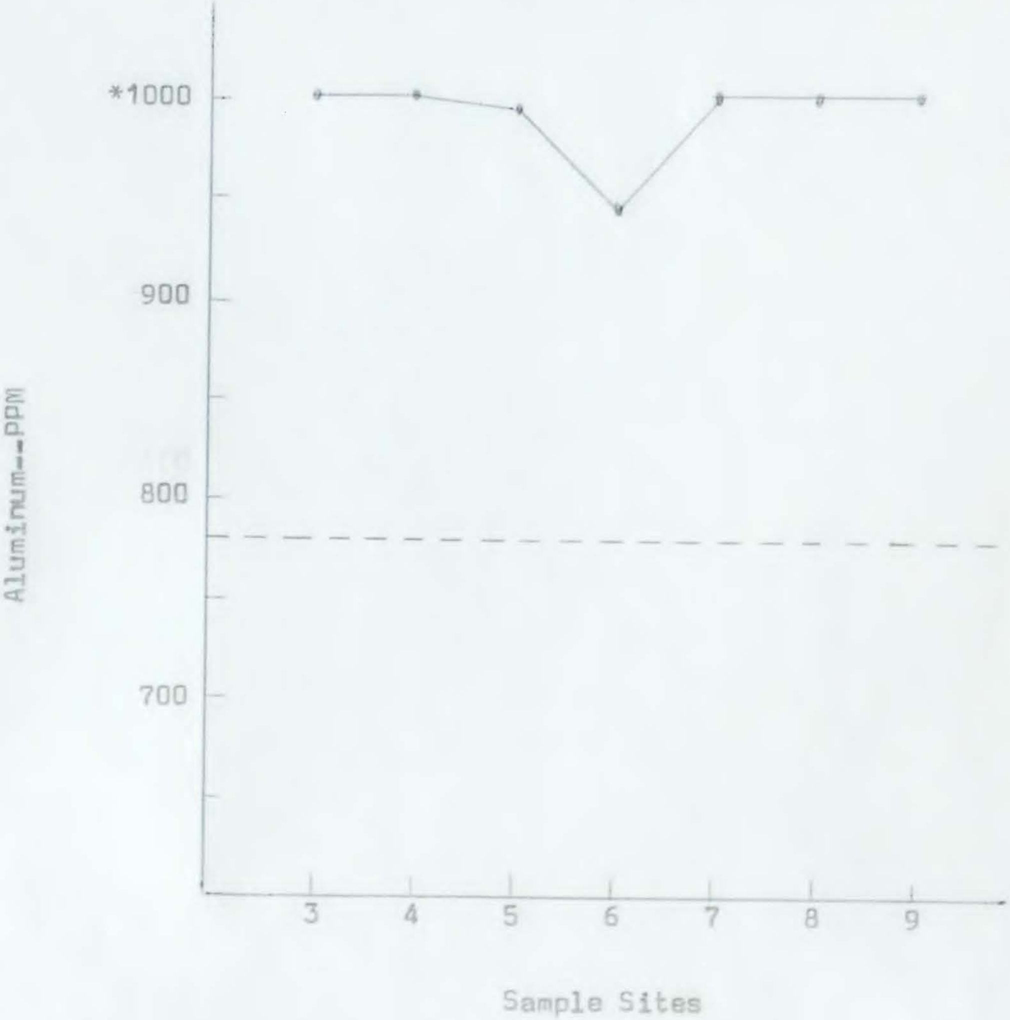
* All values of 1000 exceed detection limits of method.

Aluminum Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



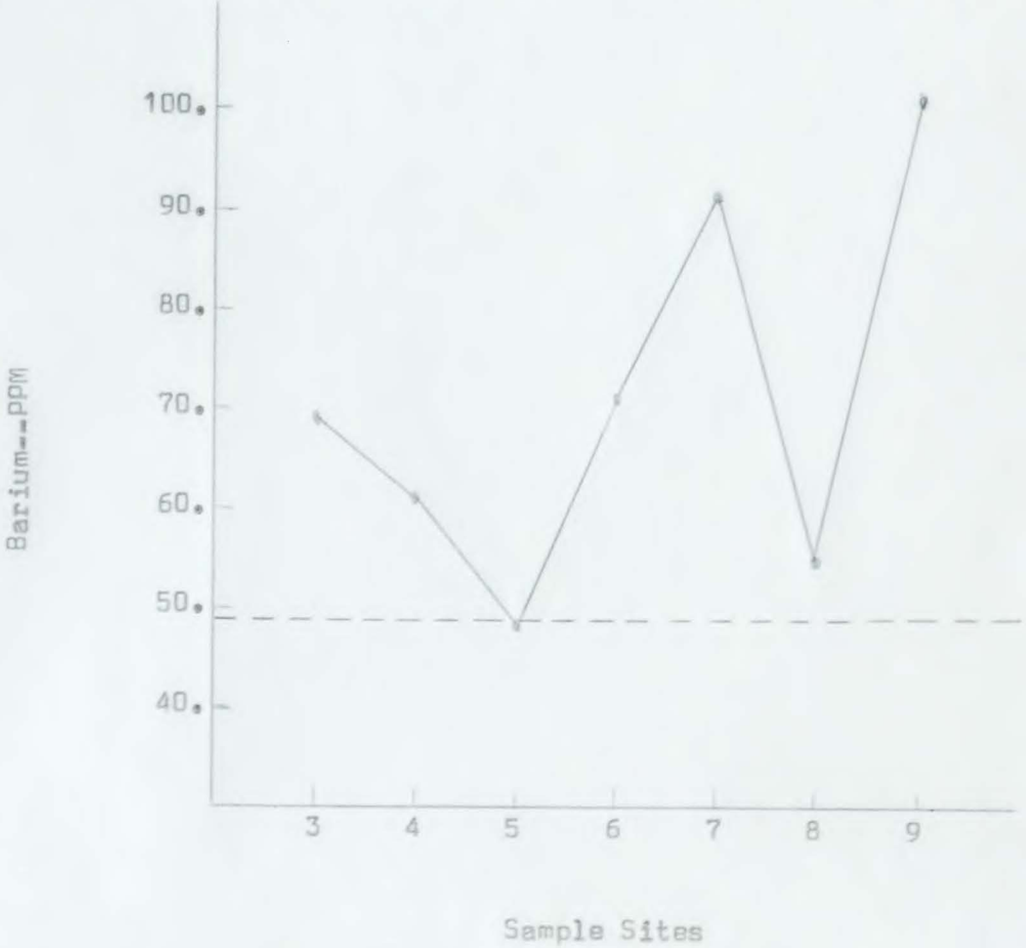
* All values of 1000 exceed detection limits of method.

Aluminum Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method

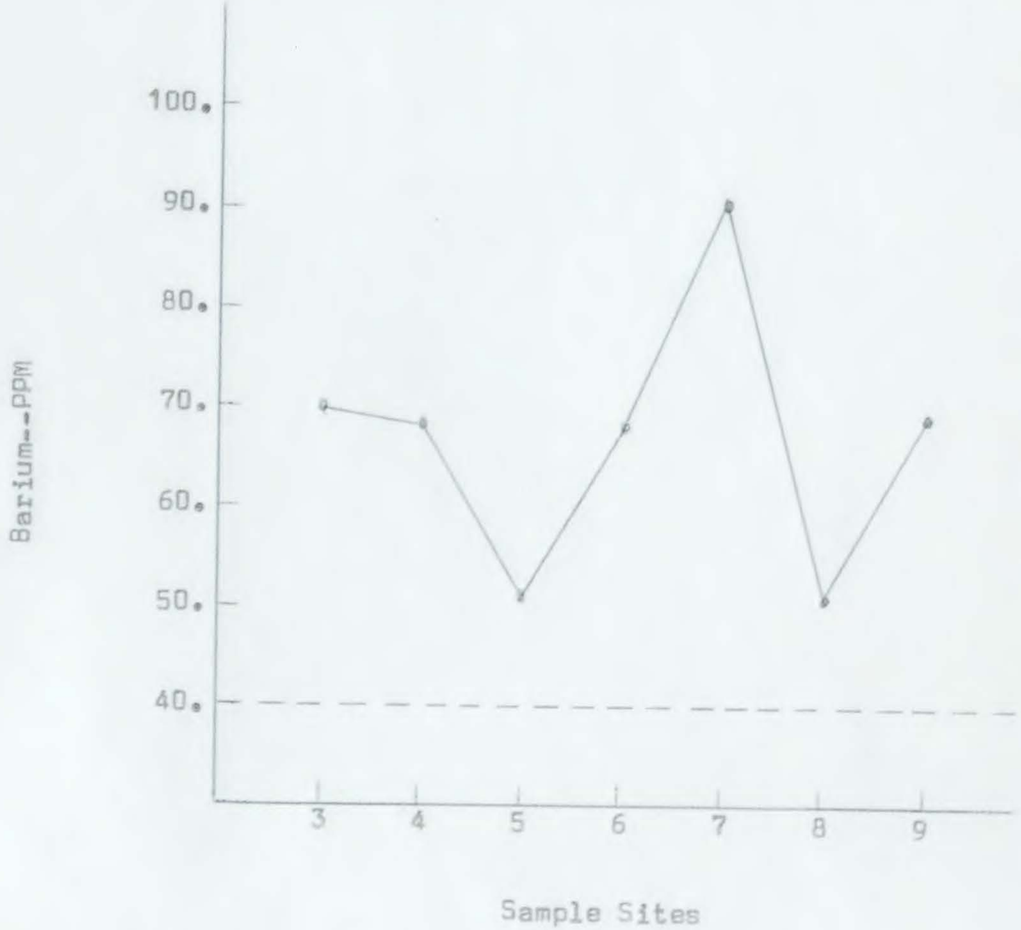


* All values of 1000 exceed detection limits of method.

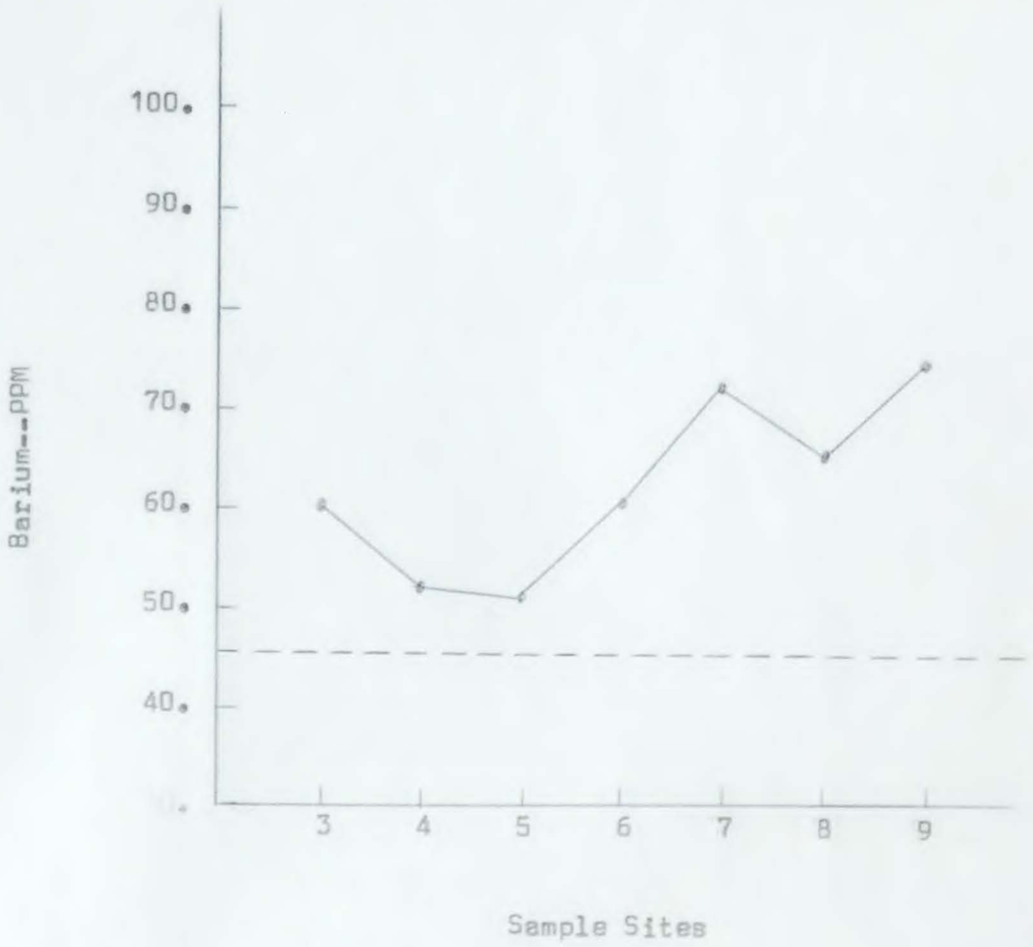
Barium Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



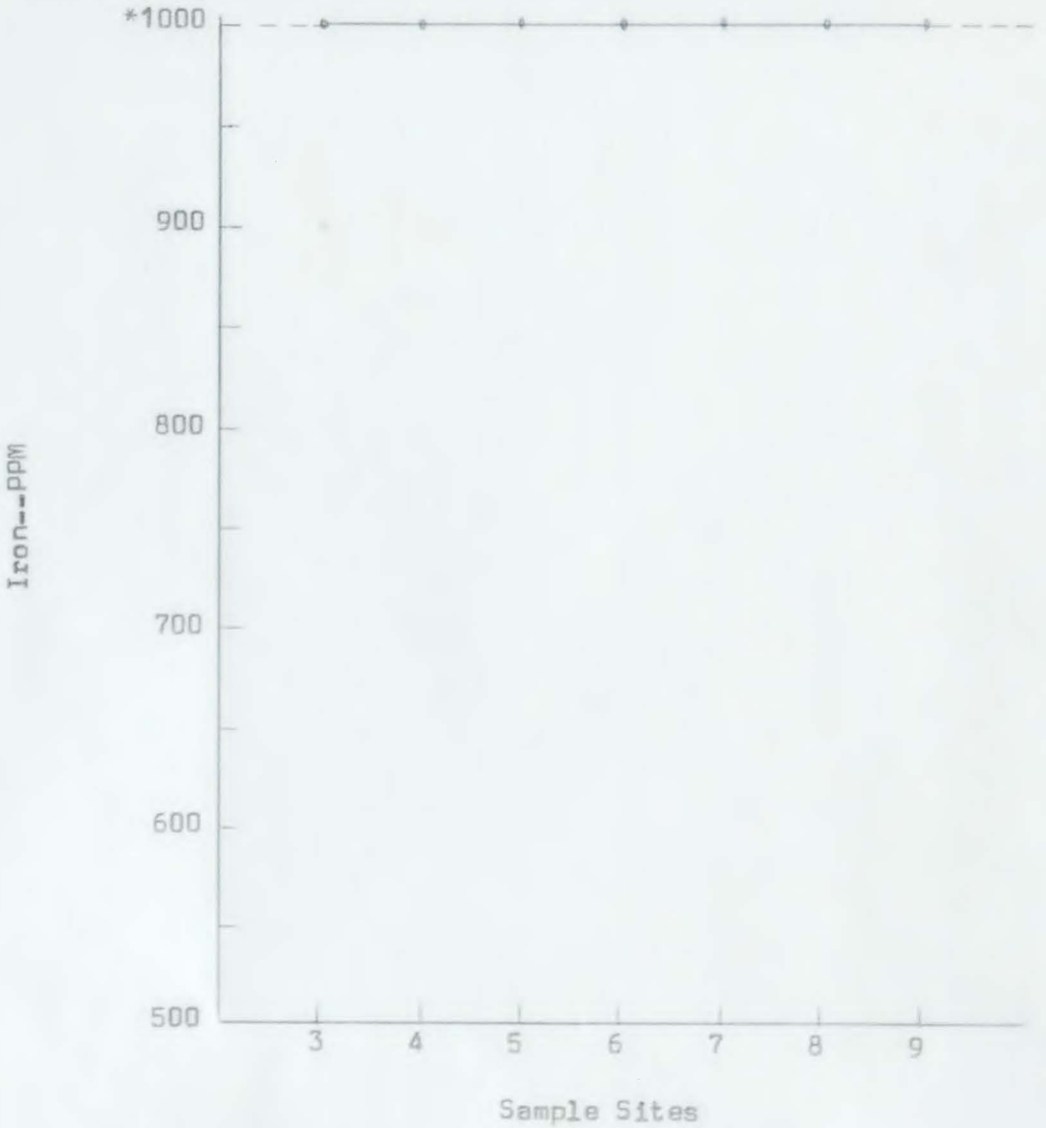
Barium Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



Barium Uptake by Rye Seedling from
Bottom 15 cm. of WES Sample Pits by Neubauer Method

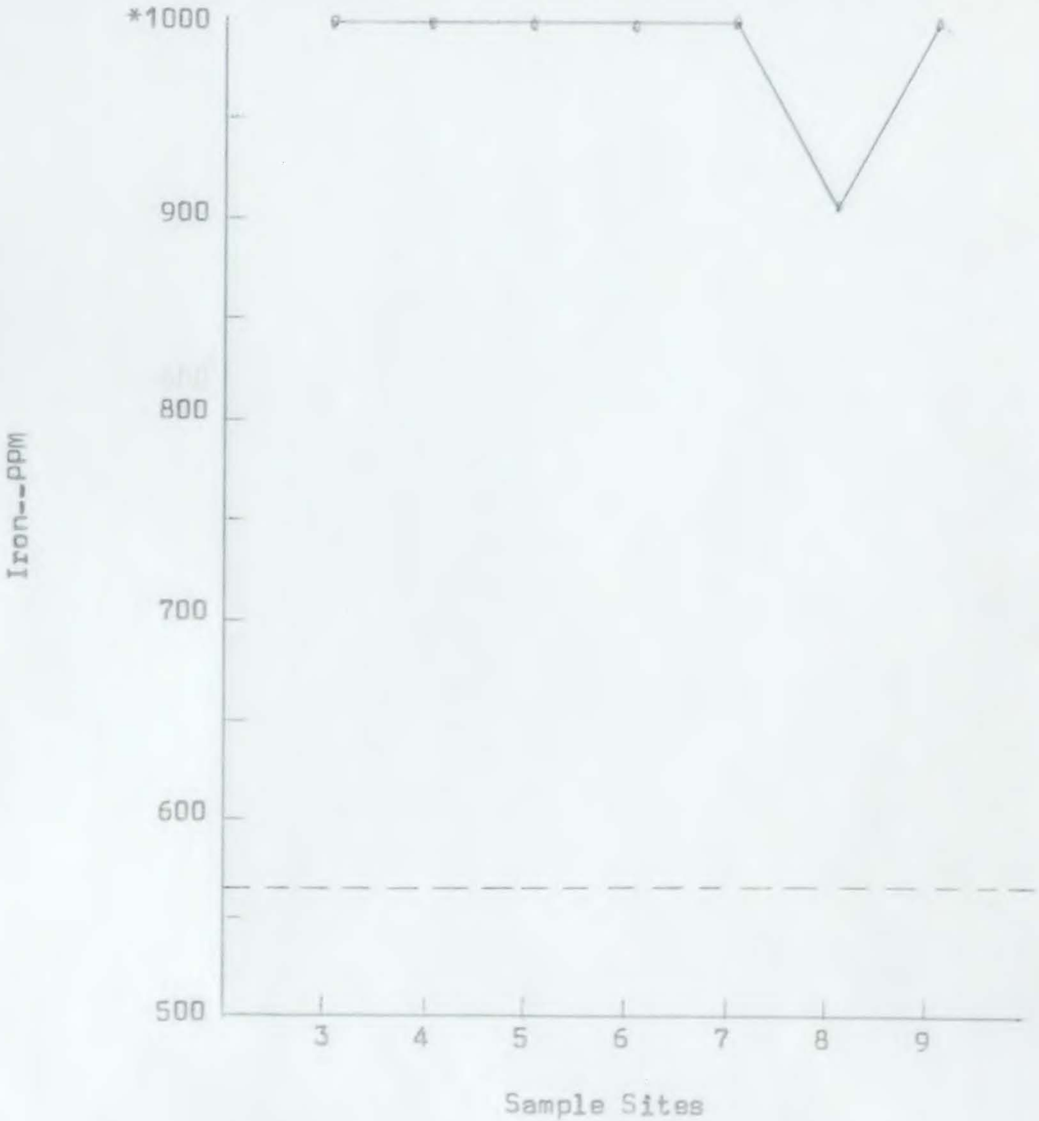


Iron Uptake by Rye Seedlings
Surface 15 cm. of WES Sample Pits by Neubauer Method



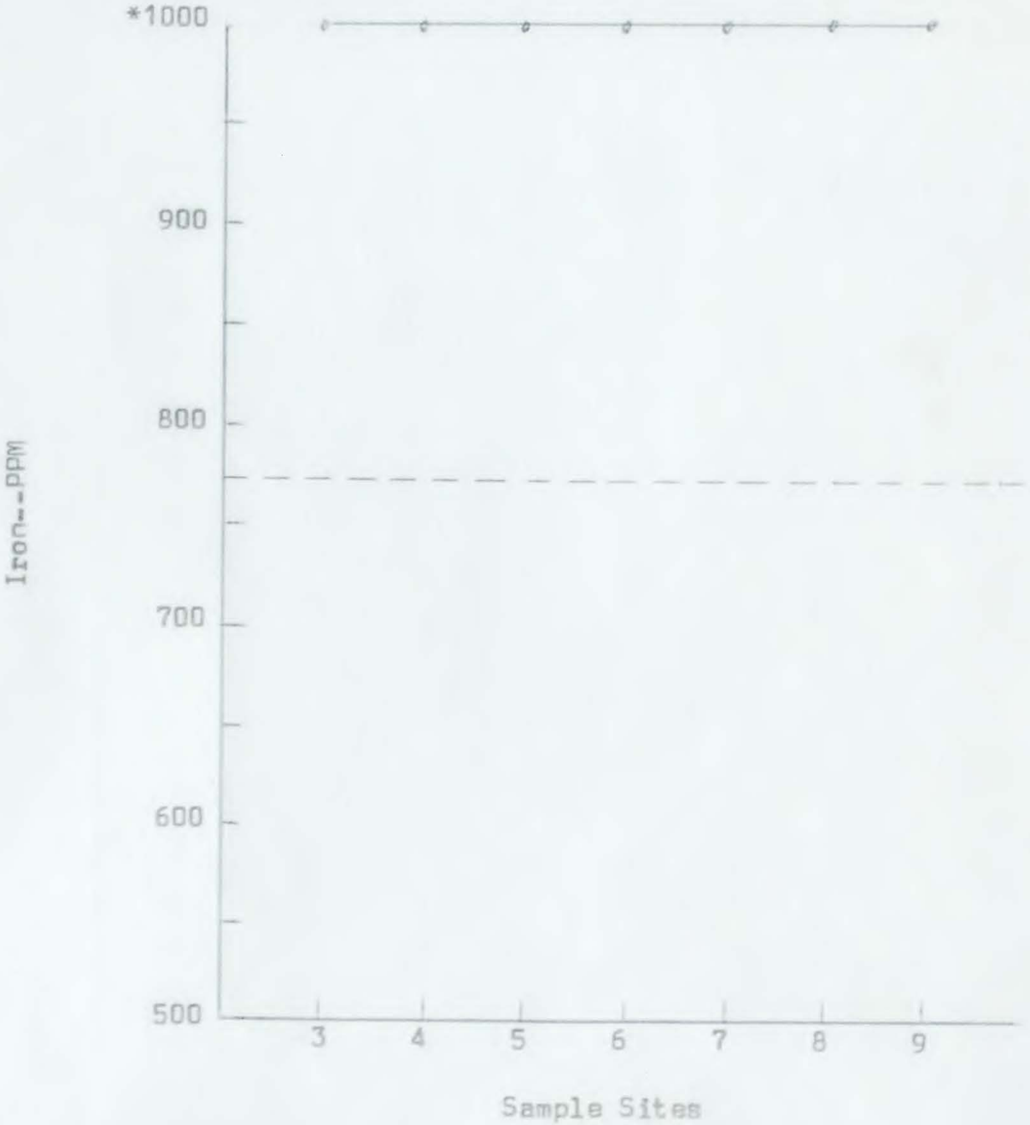
* All values of 1000 exceed detection limits of method.

Iron Uptake by Rye Seedlings
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



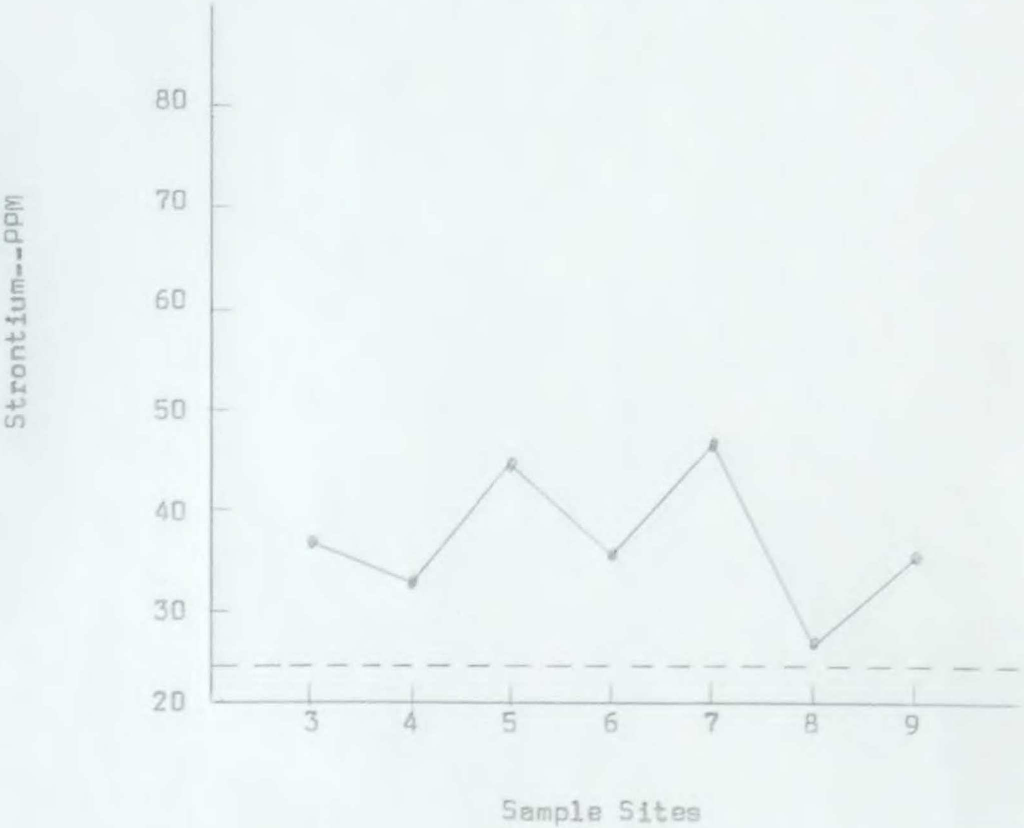
* All values of 1000 exceed detection limits of method.

Iron Uptake by Rye Seedlings
Bottom 15 cm. of WES Sample Pits by Neubauer Method

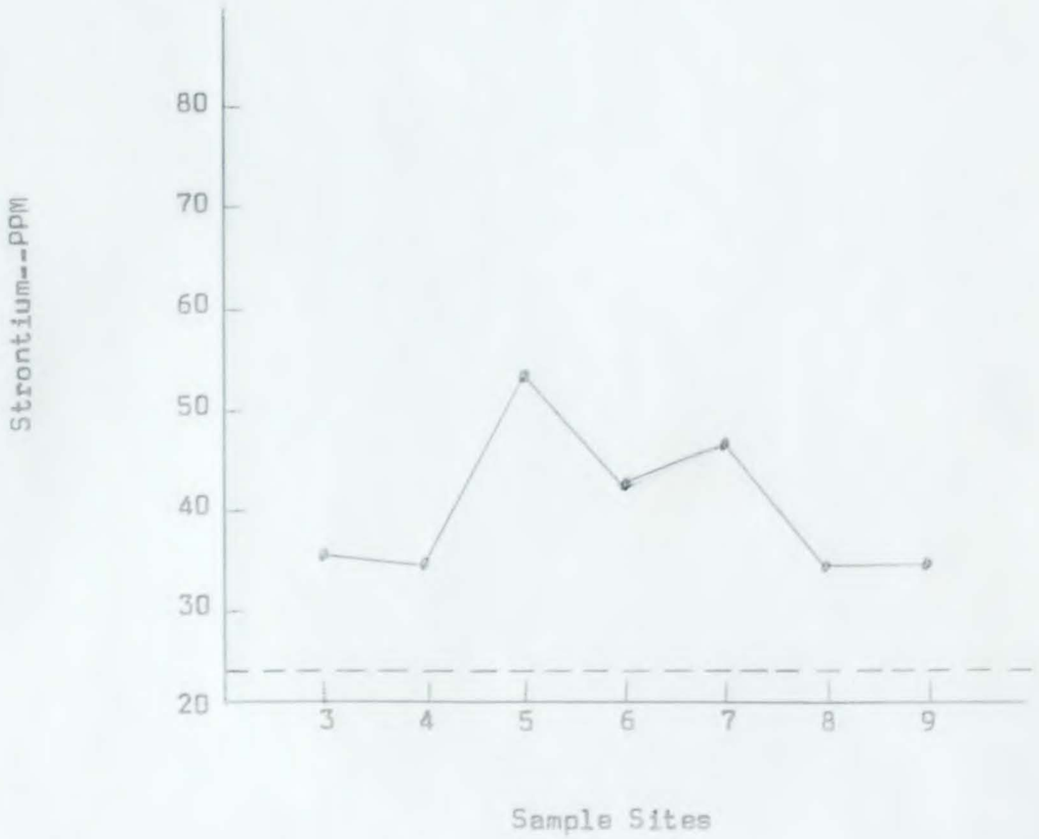


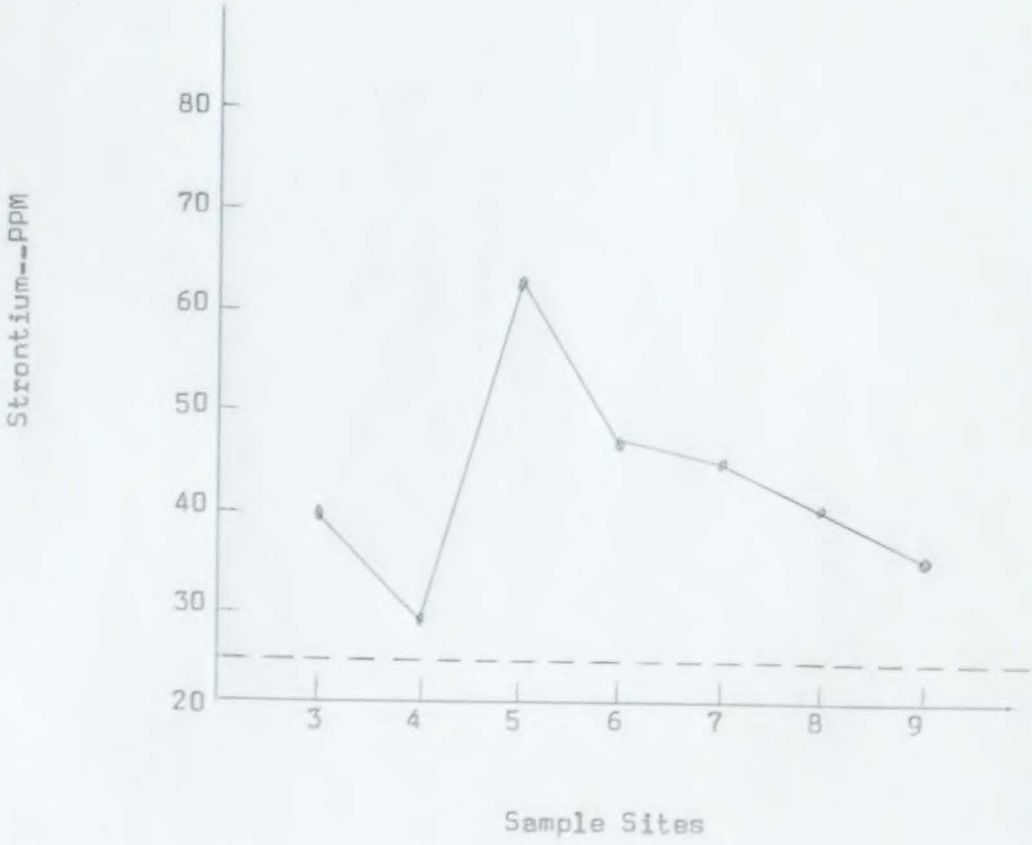
* All values of 1000 exceed detection limits of method.

Strontium Uptake by Rye Seedlings from Surface 15 cm. of WES Sample Pits by Neubauer Method



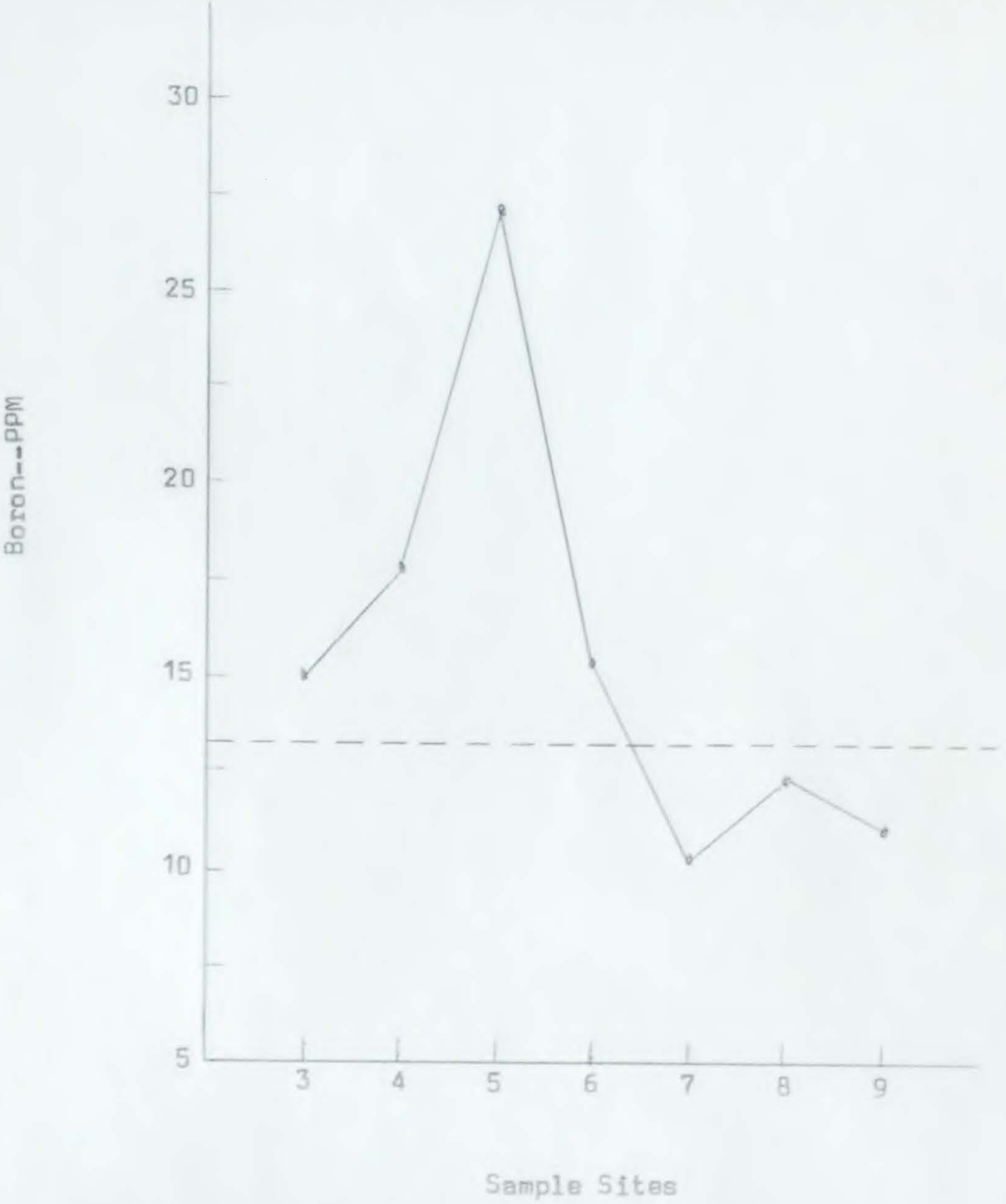
Strontium Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



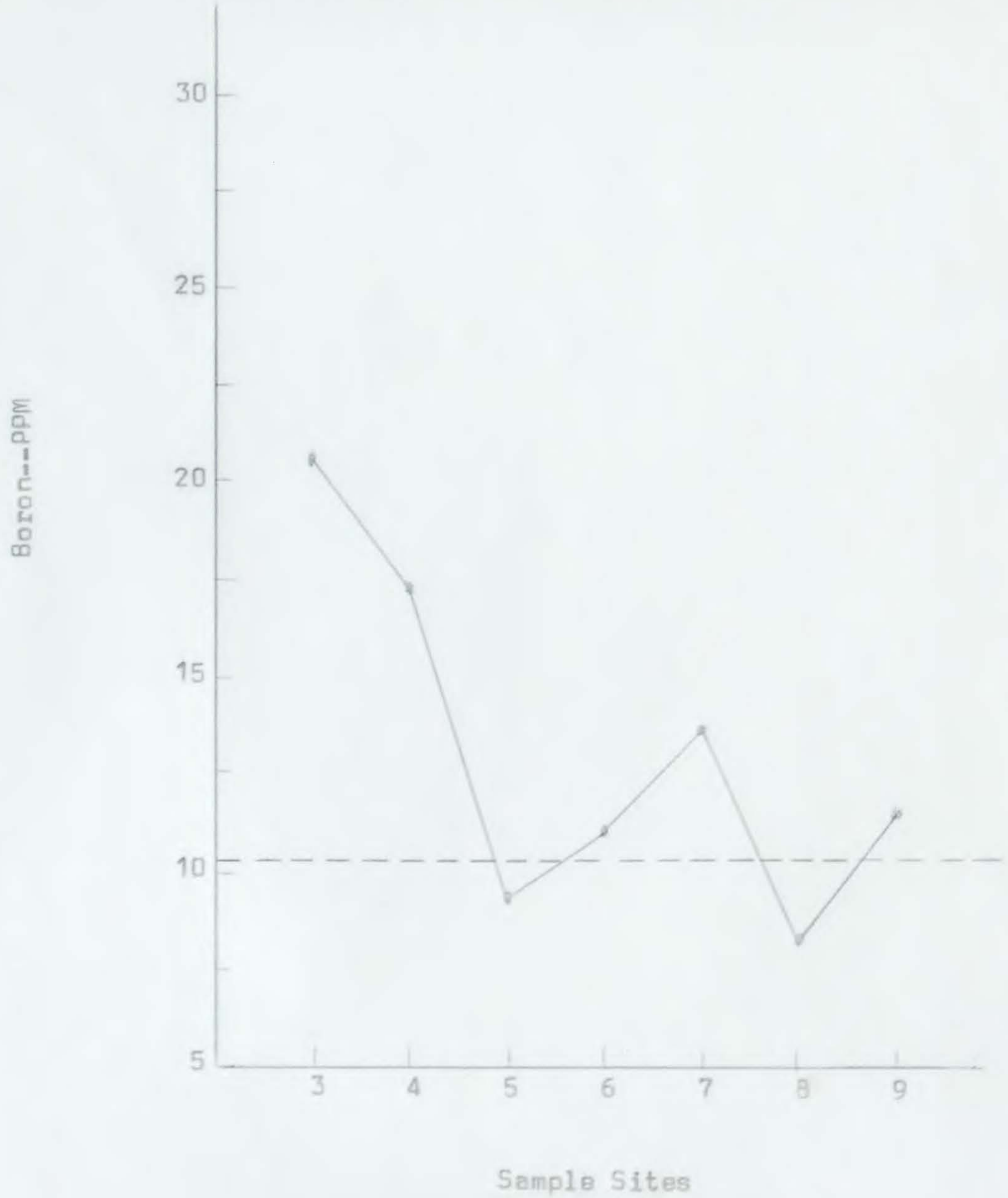


Strontium Uptake by Rye Seedlings from Bottom 15 cm. of WES Sample Pits by Neubauer Method

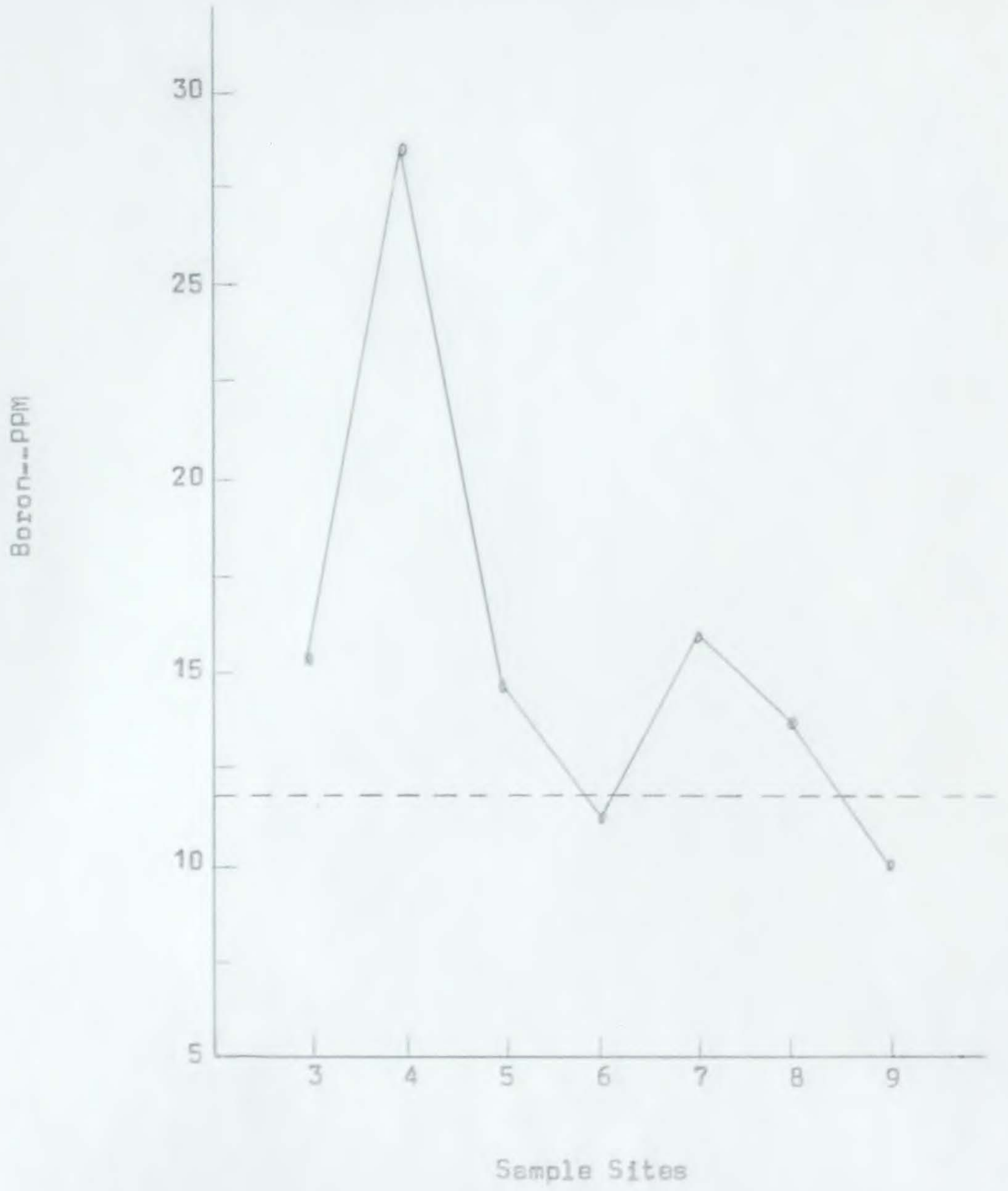
Boron Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



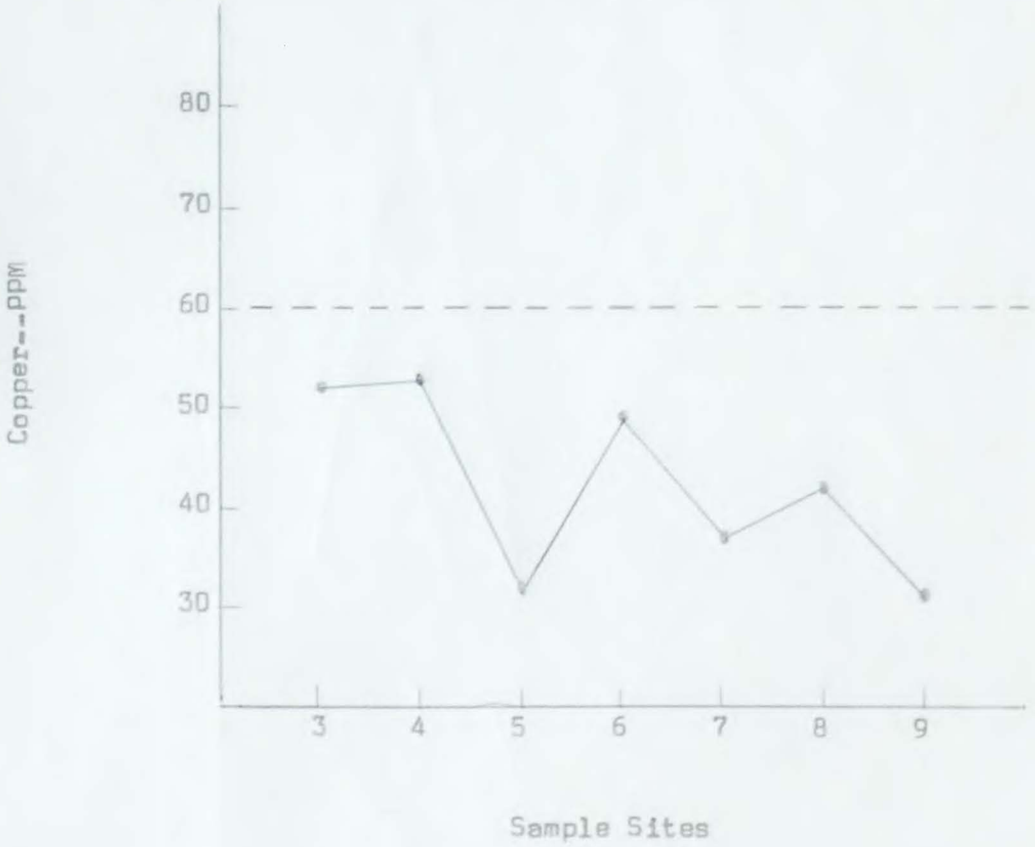
Boron Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



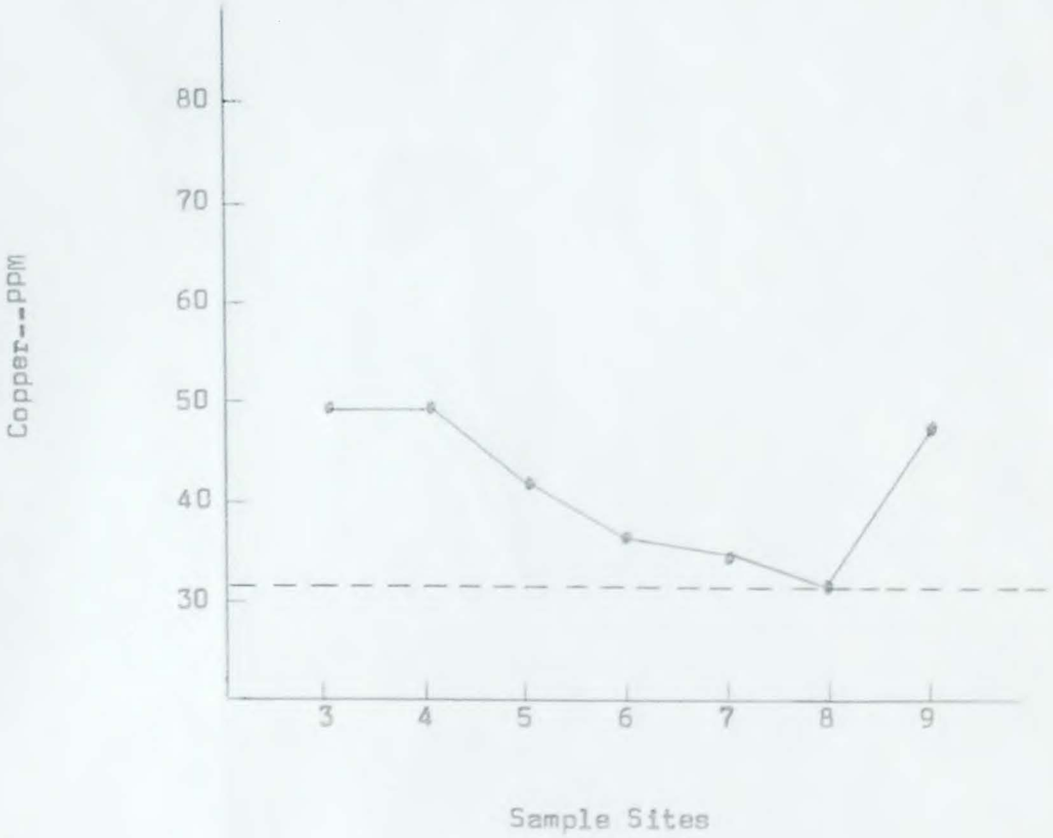
Boron Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method



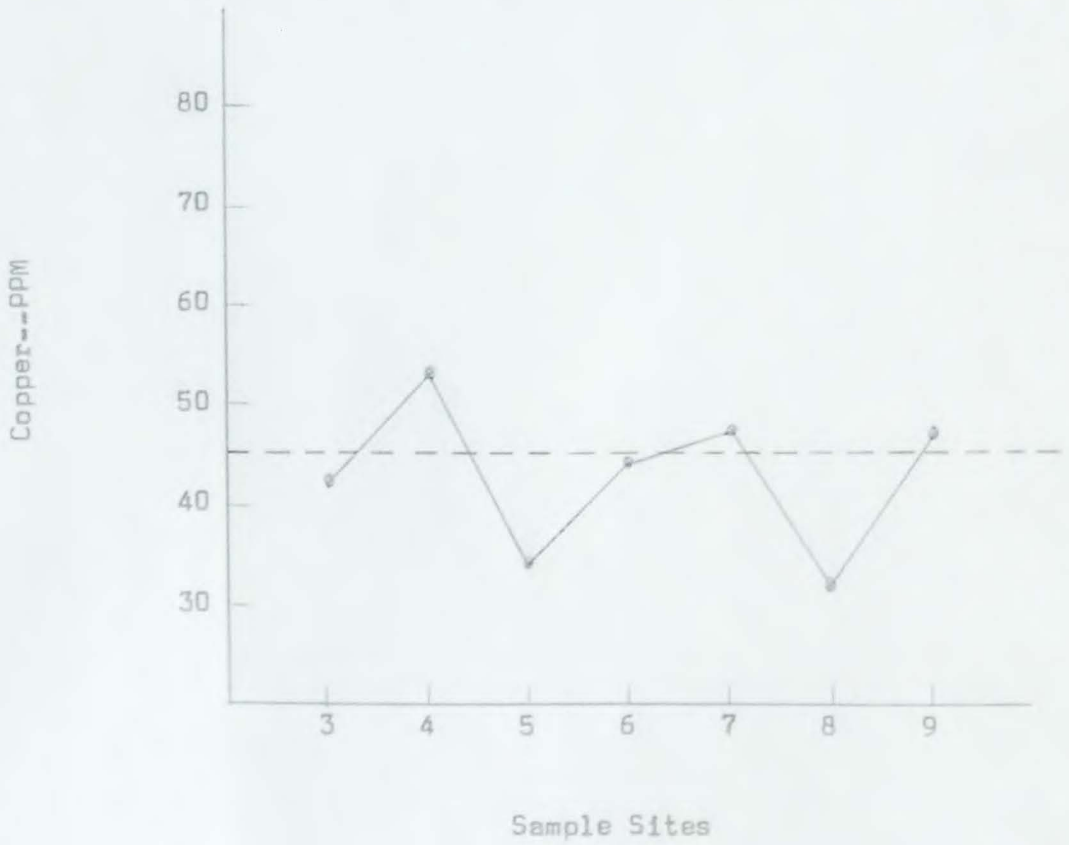
Copper Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



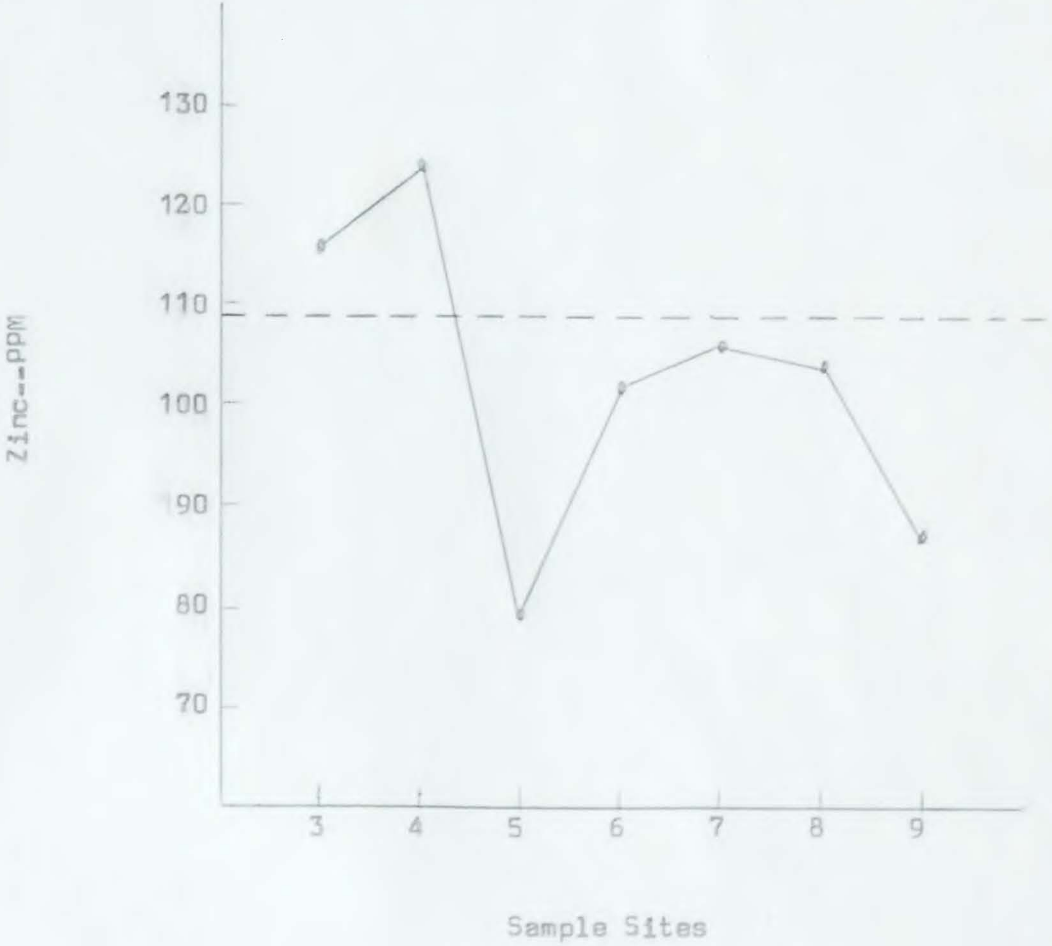
Copper Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



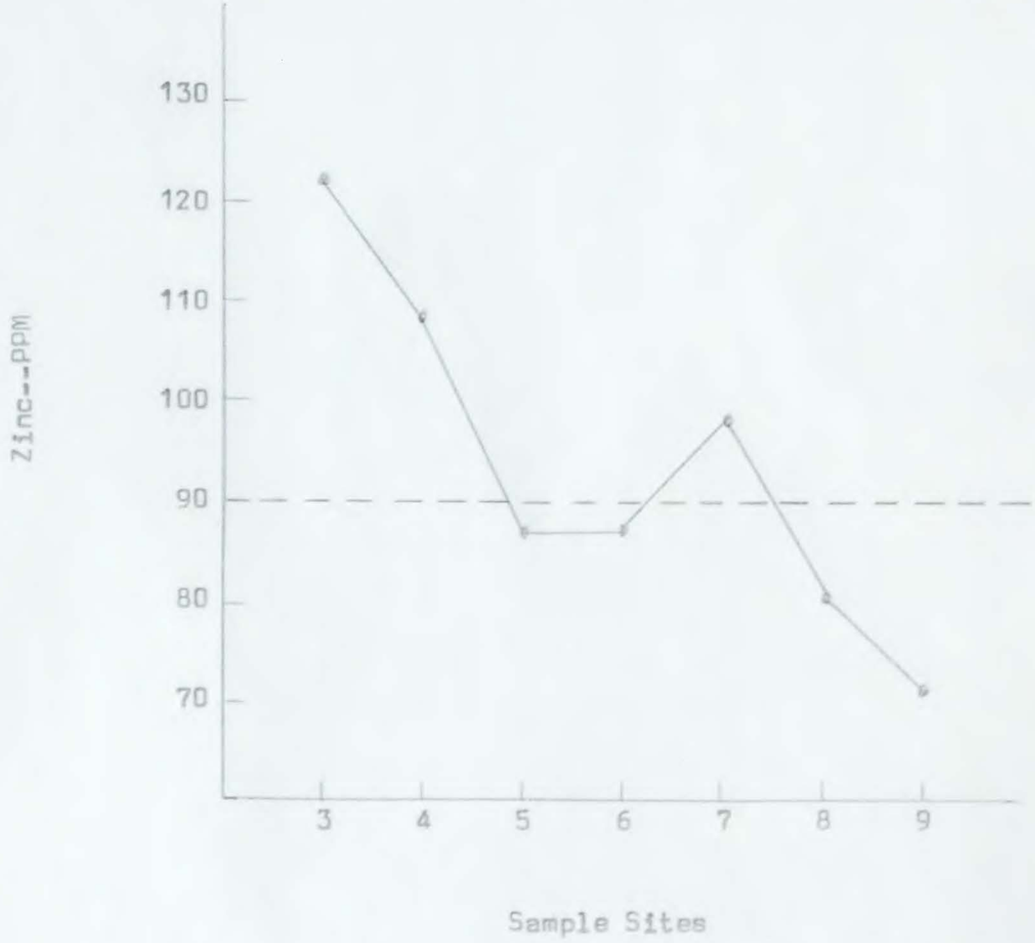
Copper Uptake by Rye Seedlings from
Bottom 15 cm. of Sample Pits by Neubauer Method



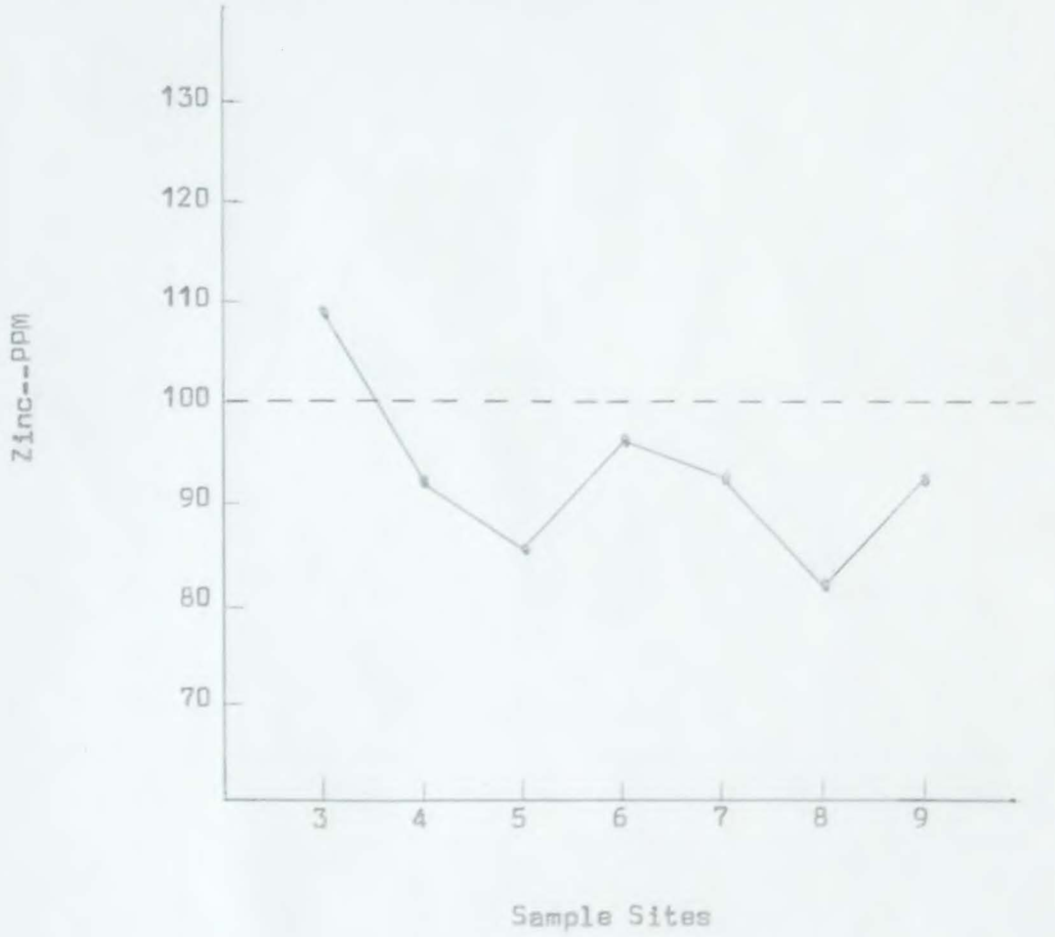
Zinc Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



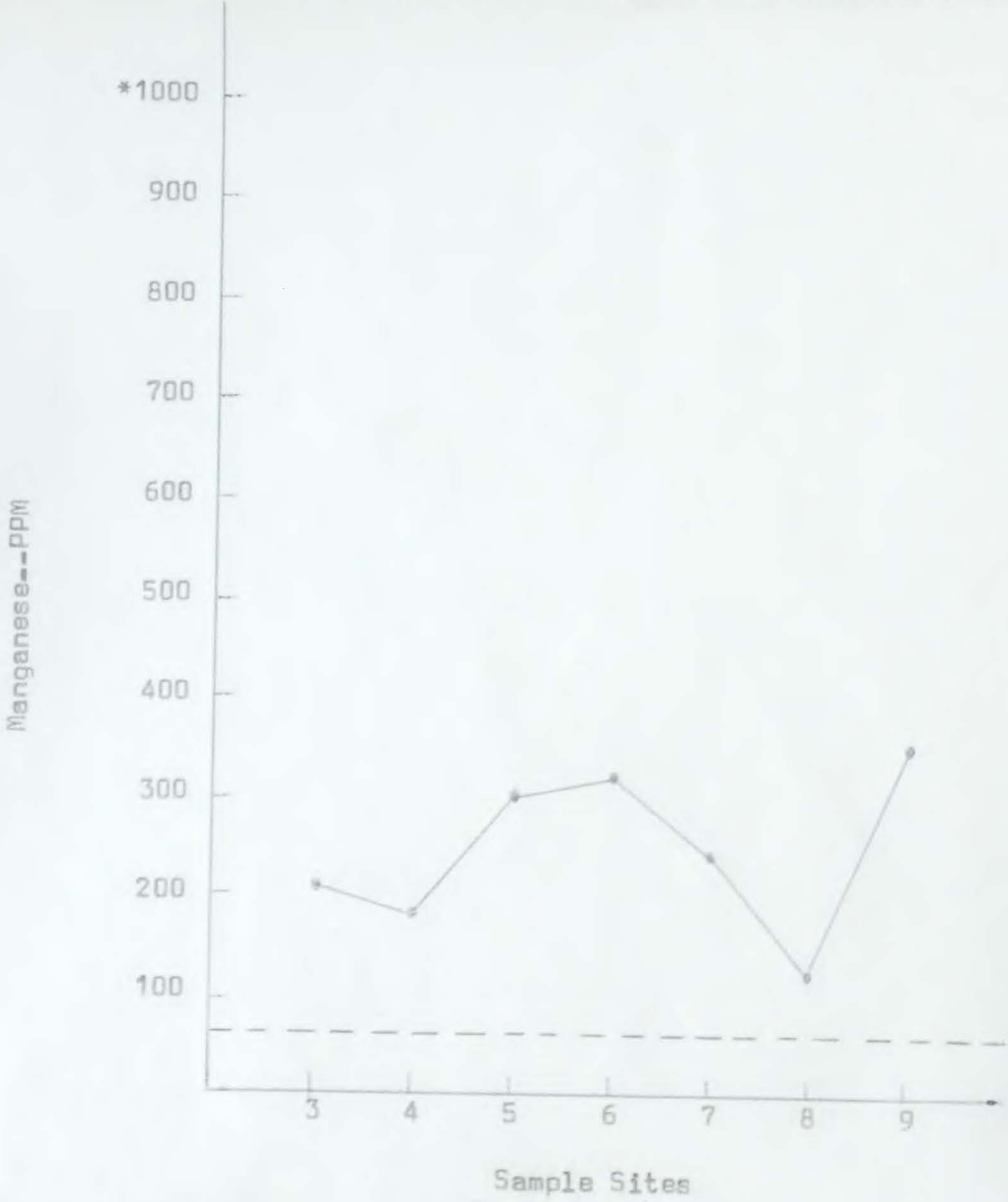
Zinc Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method



Zinc Uptake by Rye Seedlings from Bottom 15 cm. of WES Sample Pits by Neubauer Method

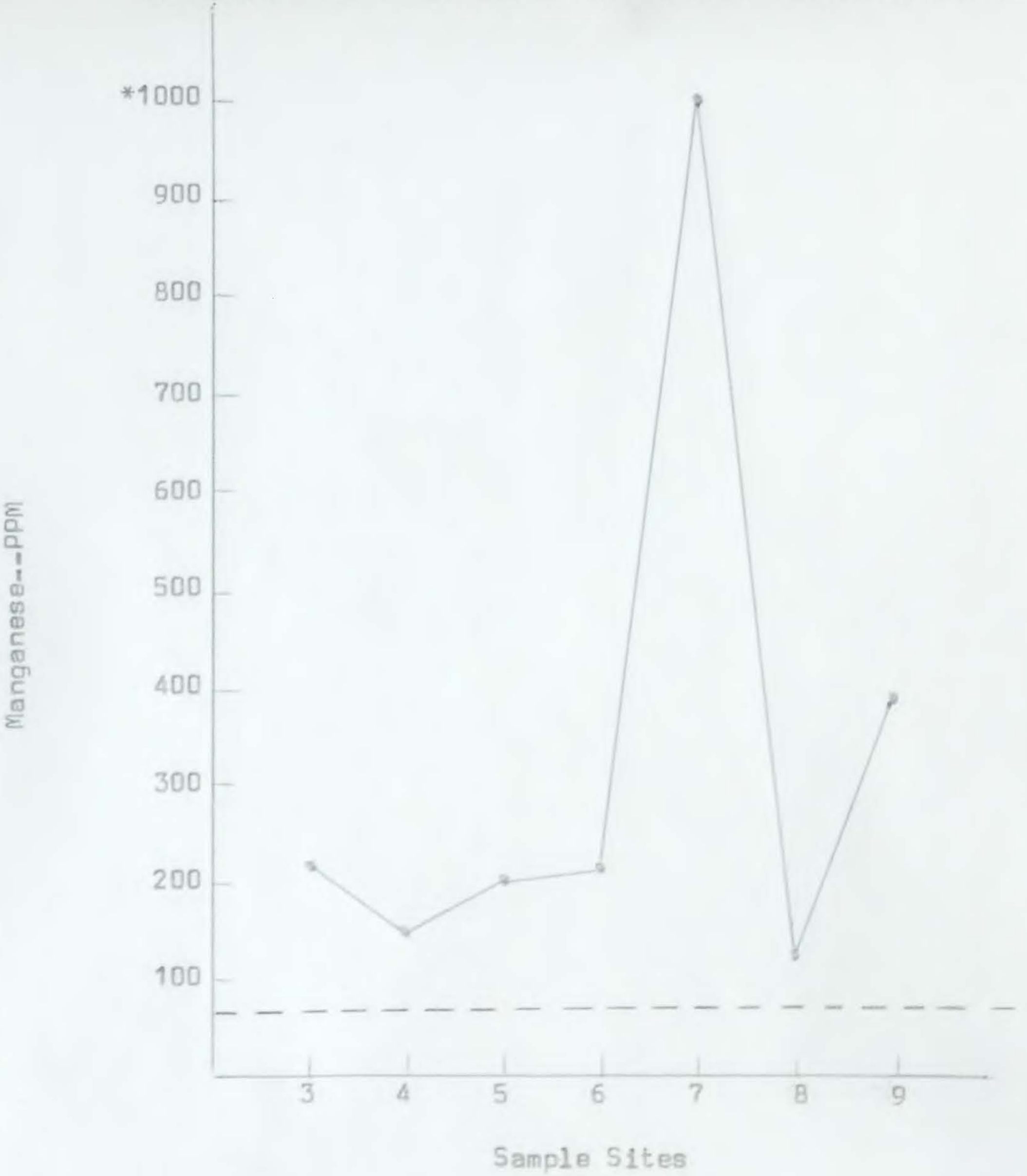


Manganese Uptake by Rye Seedlings from
Surface 15 cm. of WES Sample Pits by Neubauer Method



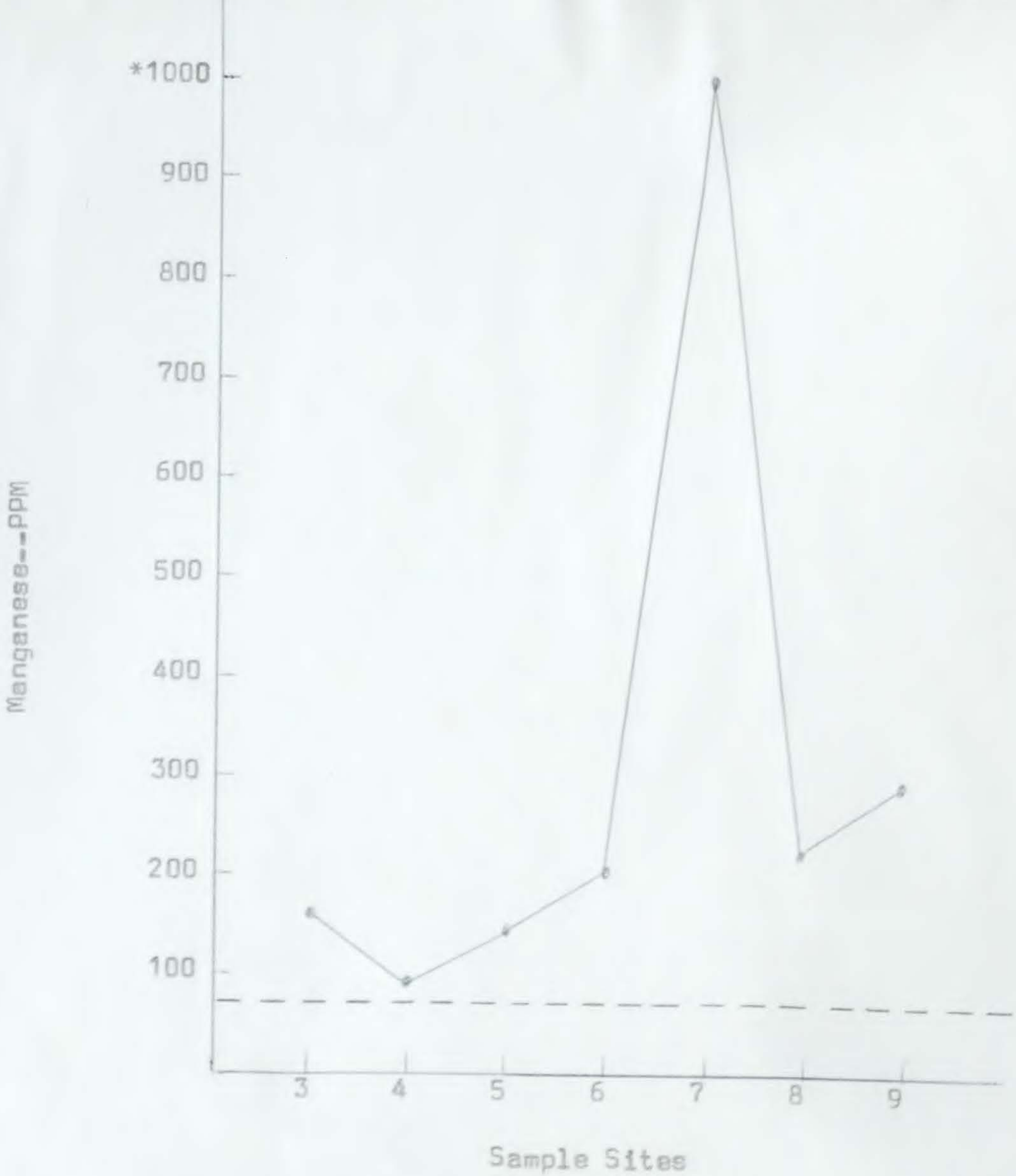
* All values of 1000 exceed detection limits of method.

Manganese Uptake by Rye Seedlings from
Mid-depth 15 cm. of WES Sample Pits by Neubauer Method

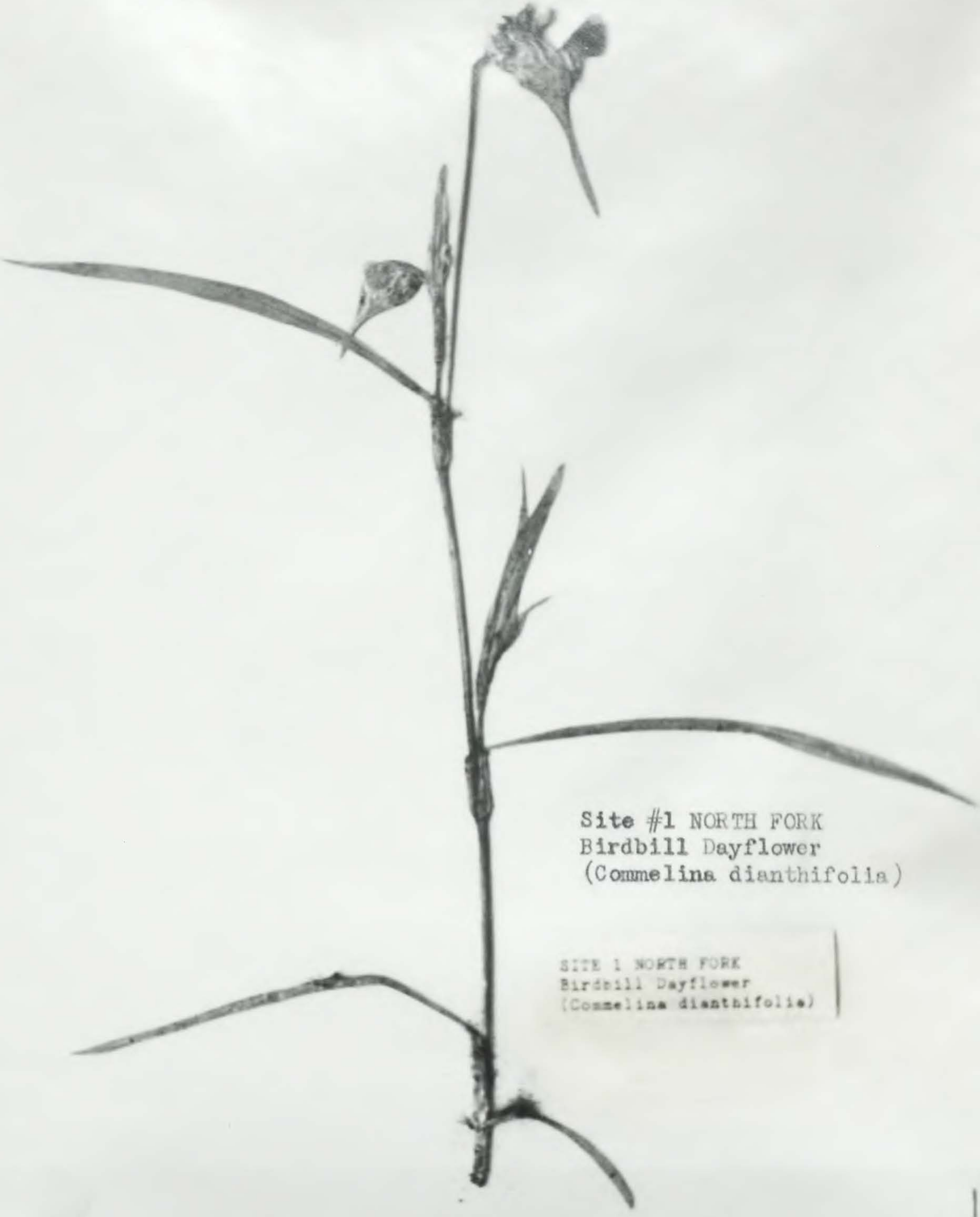


* All values of 1000 exceed detection limits of method.

Manganese Uptake by Rye Seedlings from
Bottom 15 cm. of WES Sample Pits by Neubauer Method



* All values of 1000 exceed detection of method.



Site #1 NORTH FORK
Birdbill Dayflower
(**Commelina** dianthifolia)

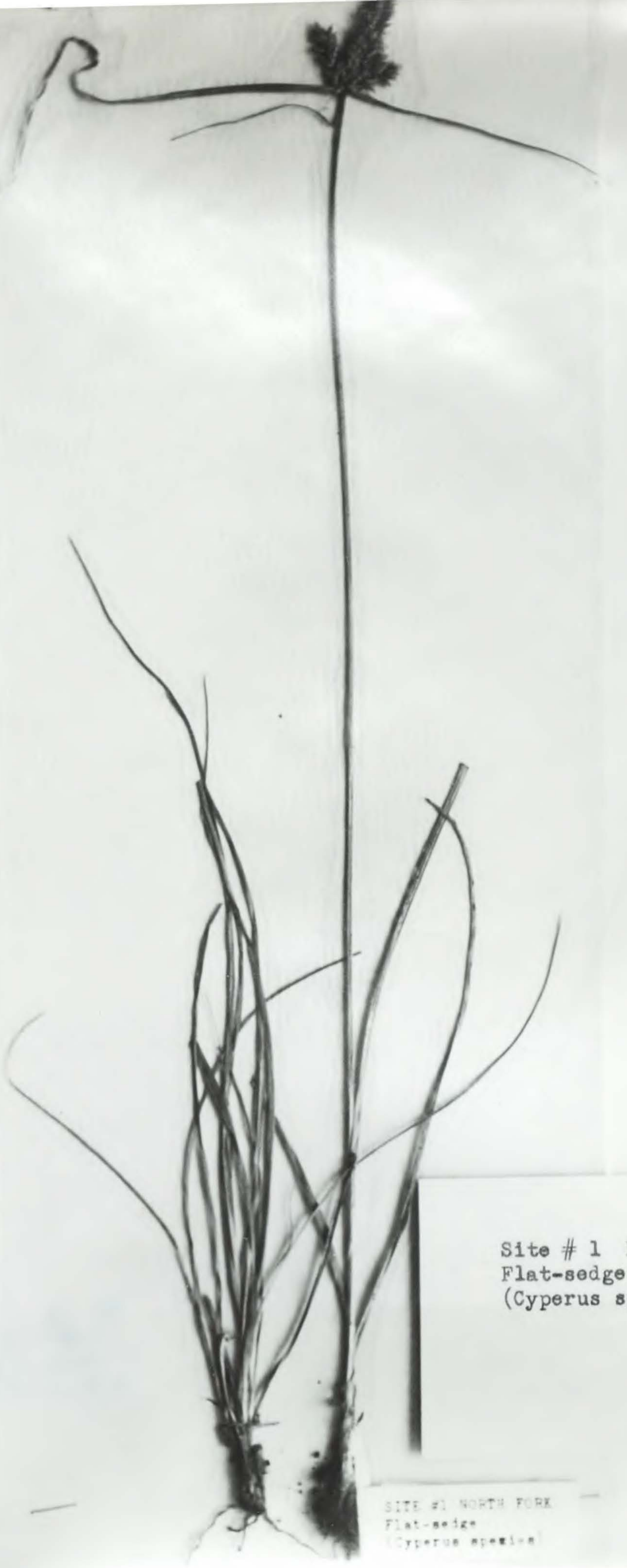
SITE 1 NORTH FORK
Birdbill Dayflower
(Commelina dianthifolia)

Site #3 NORTH FORK
Louisiana wormwood
(Artemesia ludo-
vicinata sulcata)

SITE #3 NORTH FORK
LouisianaWormwood
(Artemisia ludovicinana sulcata)

Site #1 MIDDLE FORK
Louisiana Wormwood
(Artemesia ludo-
vicinata sulcata)

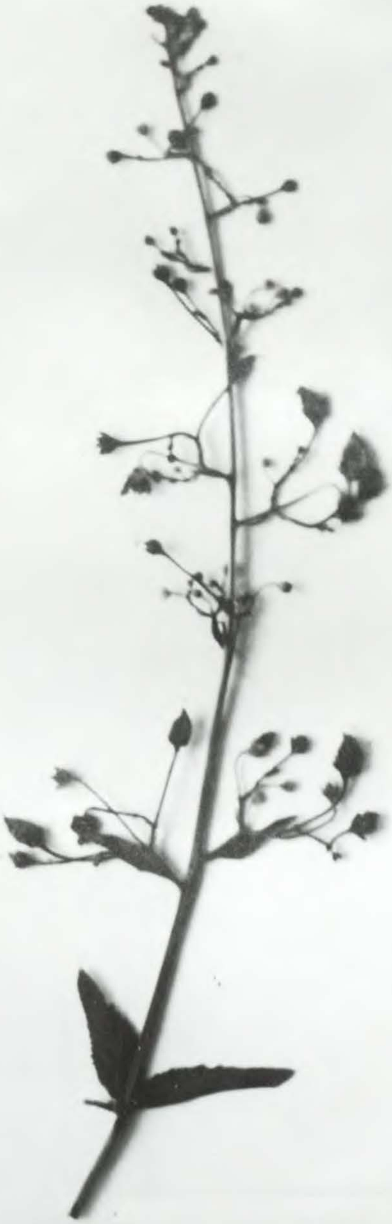
SITE #1 MIDDLE FORK
Louisiana Wormwood
(Artemesia ludoviciana
sulcata)


SITE #1 NORTH FORK
Flat-sedge
(Cyperus spezies)

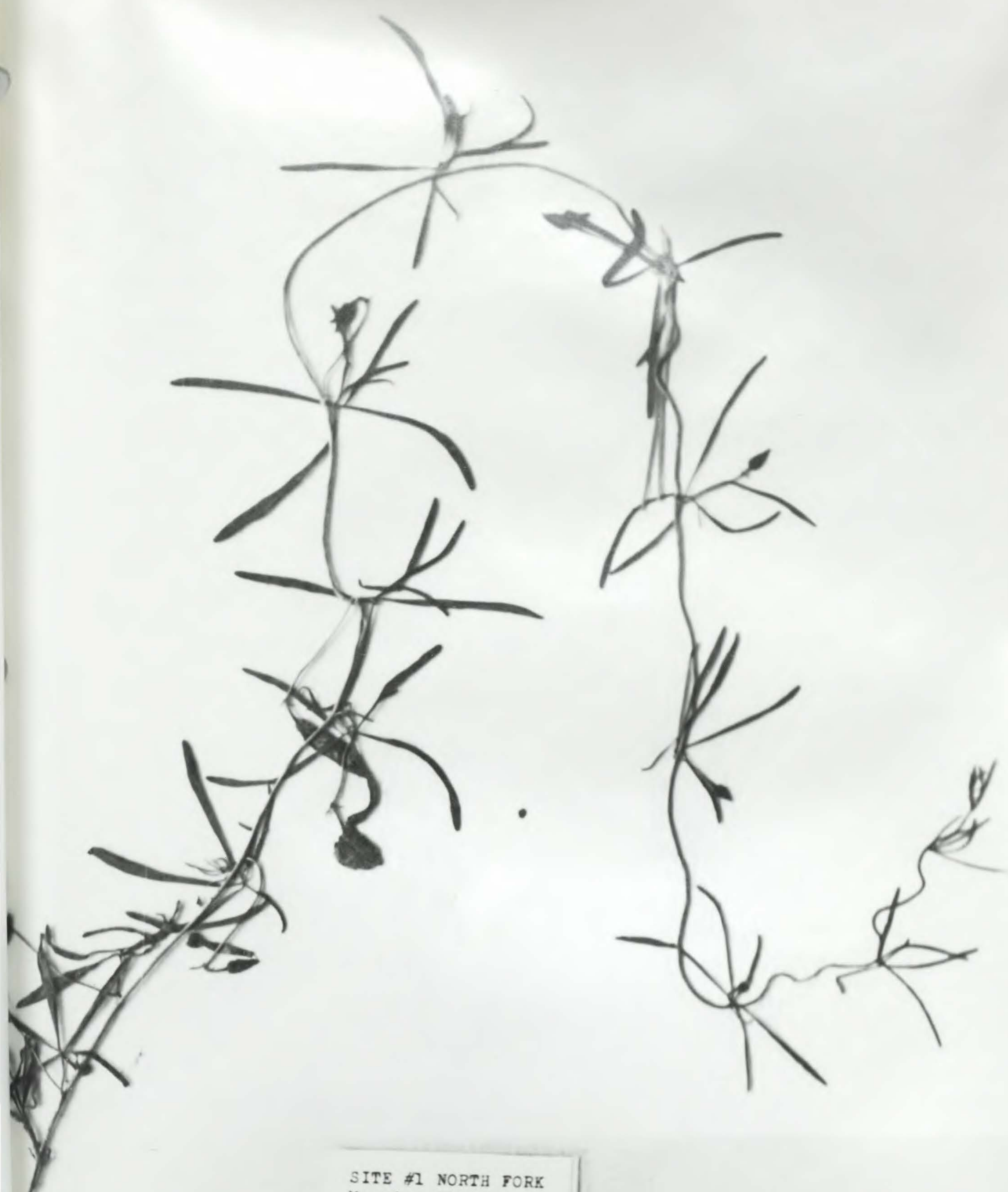
Site # 1 NORTH FORK
Flat-sedge
(Cyperus spezies)

SITE #1 NORTH FORK
Curly Dock
(Rumex crispus)

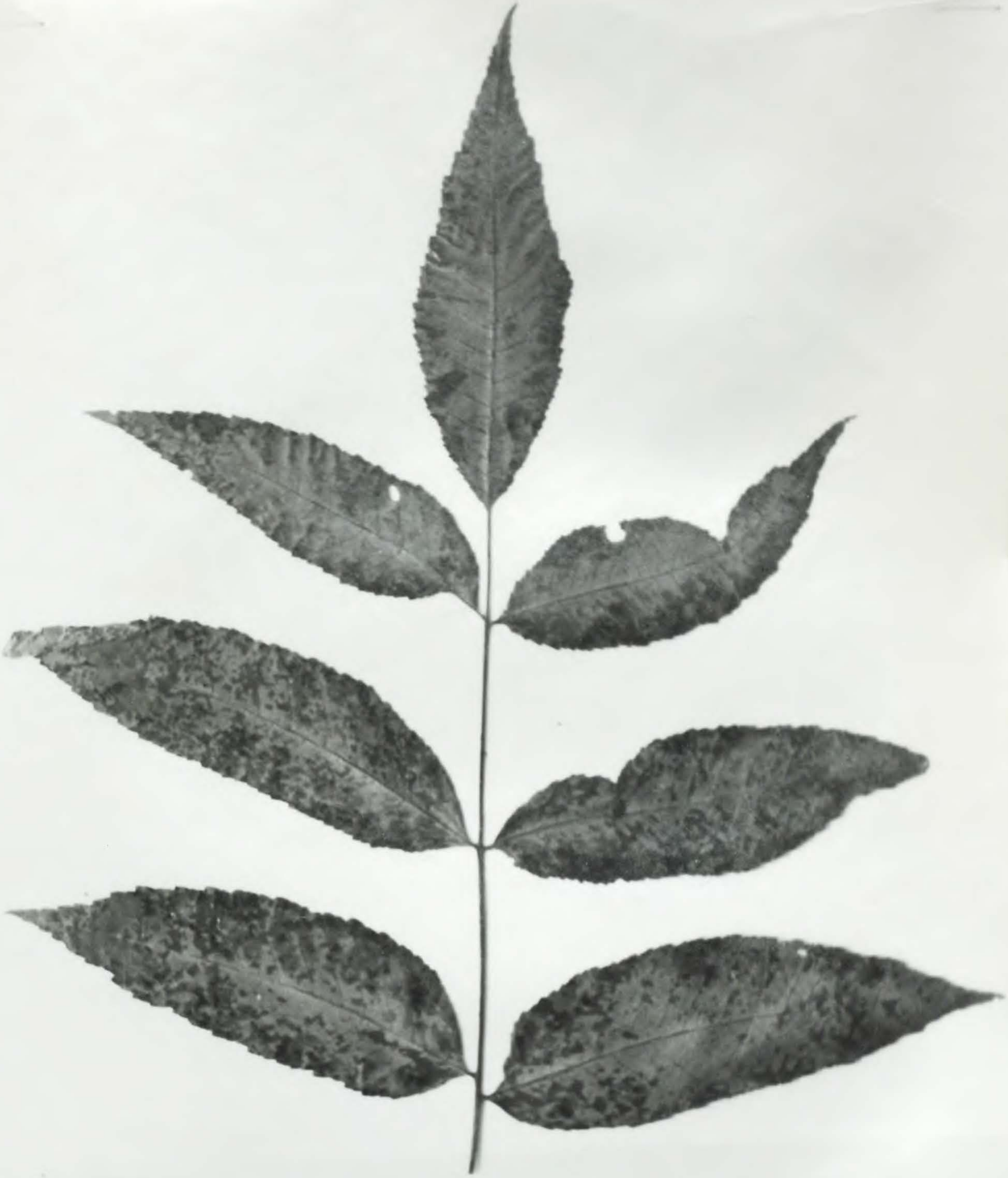
9



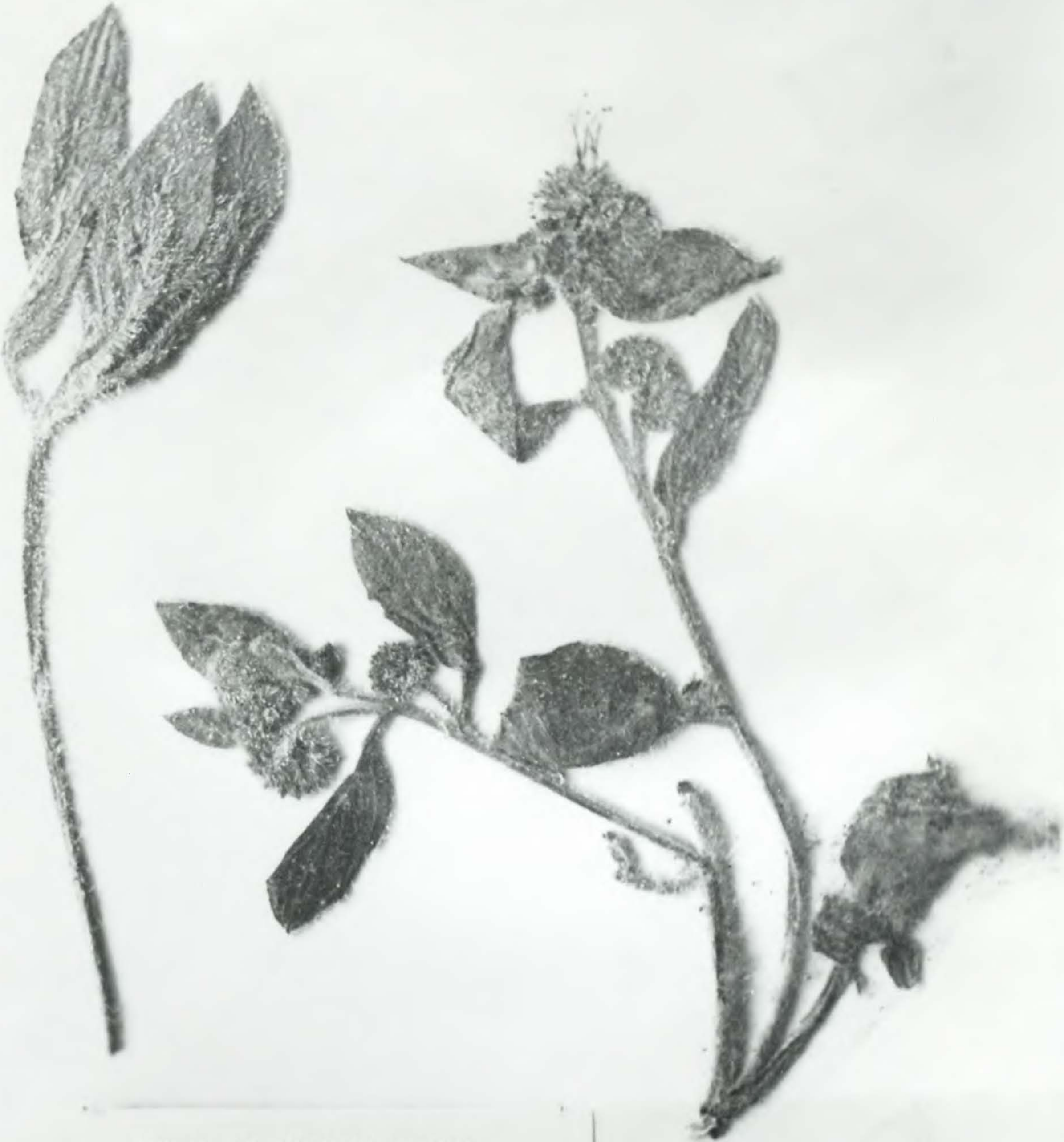
SITE #1 NORTH FORK
Figwort family
(Scrophularia parviflora)
Flower habit



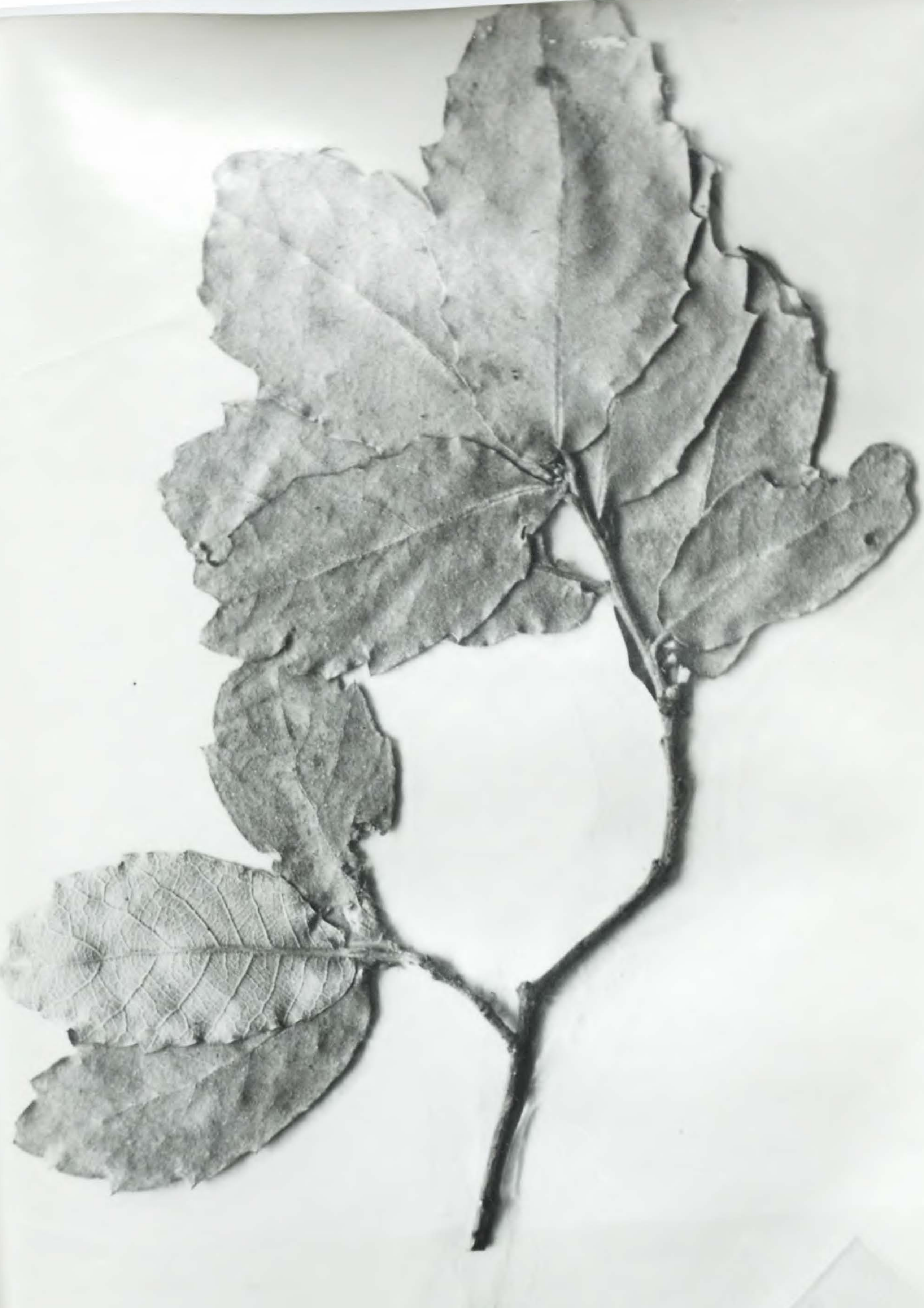
SITE #1 NORTH FORK
Morning Glory
(Ipomoea Plummerae)



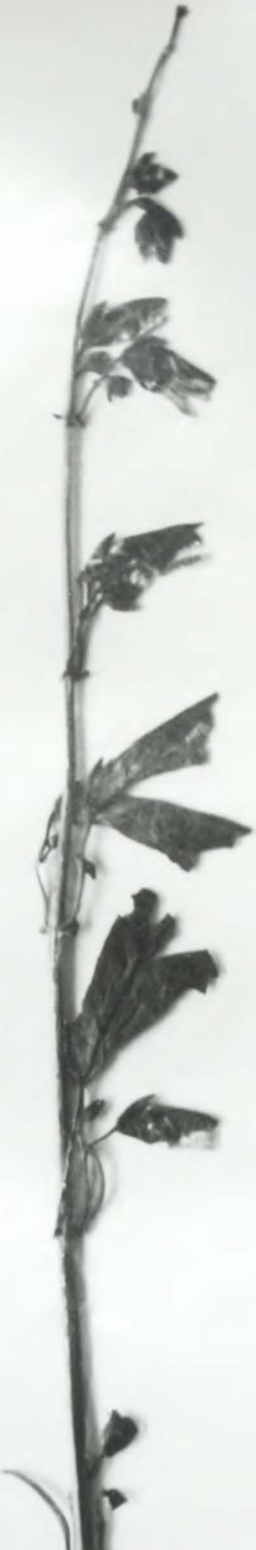
SITE #1 NORTH FORK
Arizona Walnut
(Juglans major)



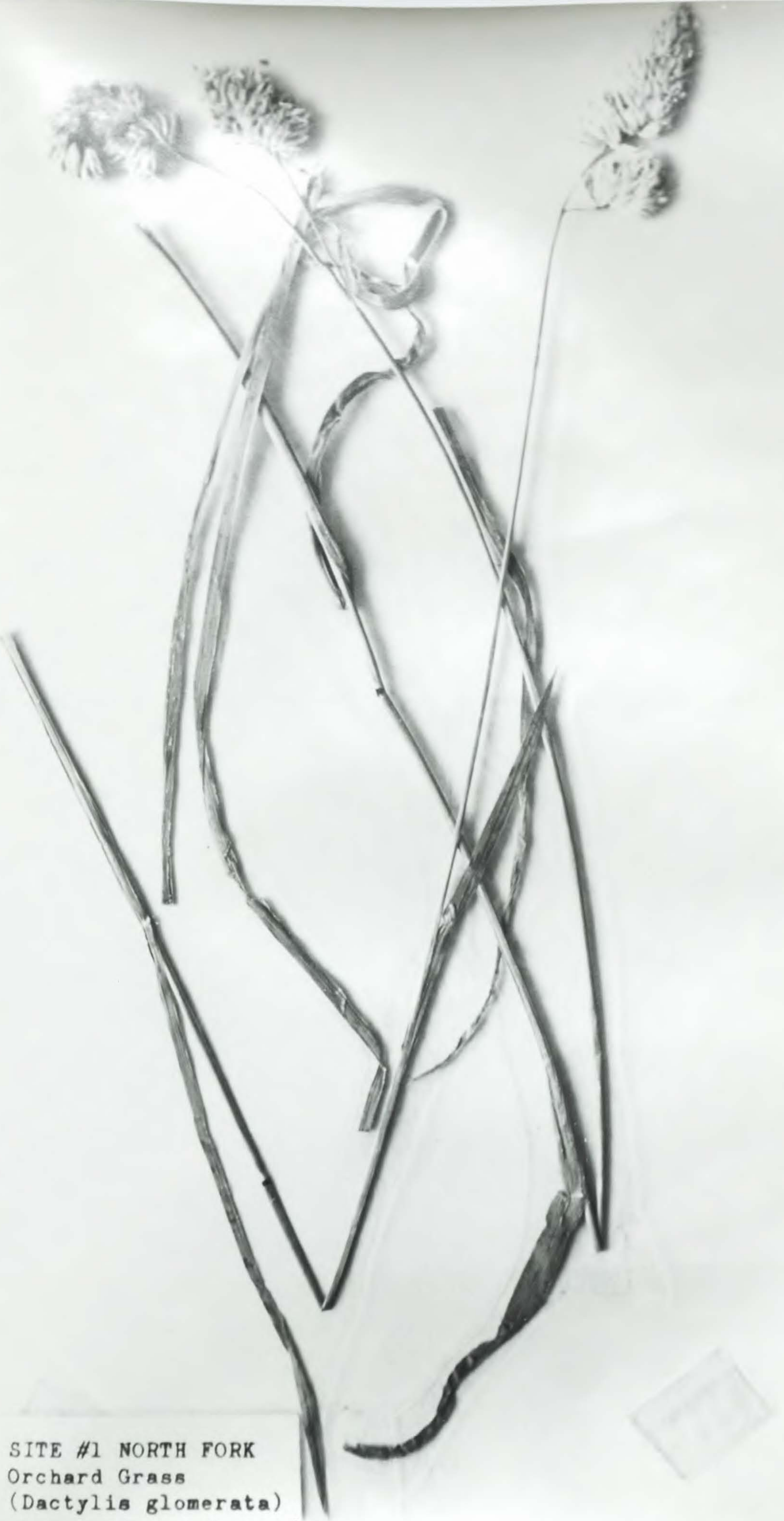
SITE #1 NORTH FORK
Caterpillar Weed
(Phacelia magellanica)



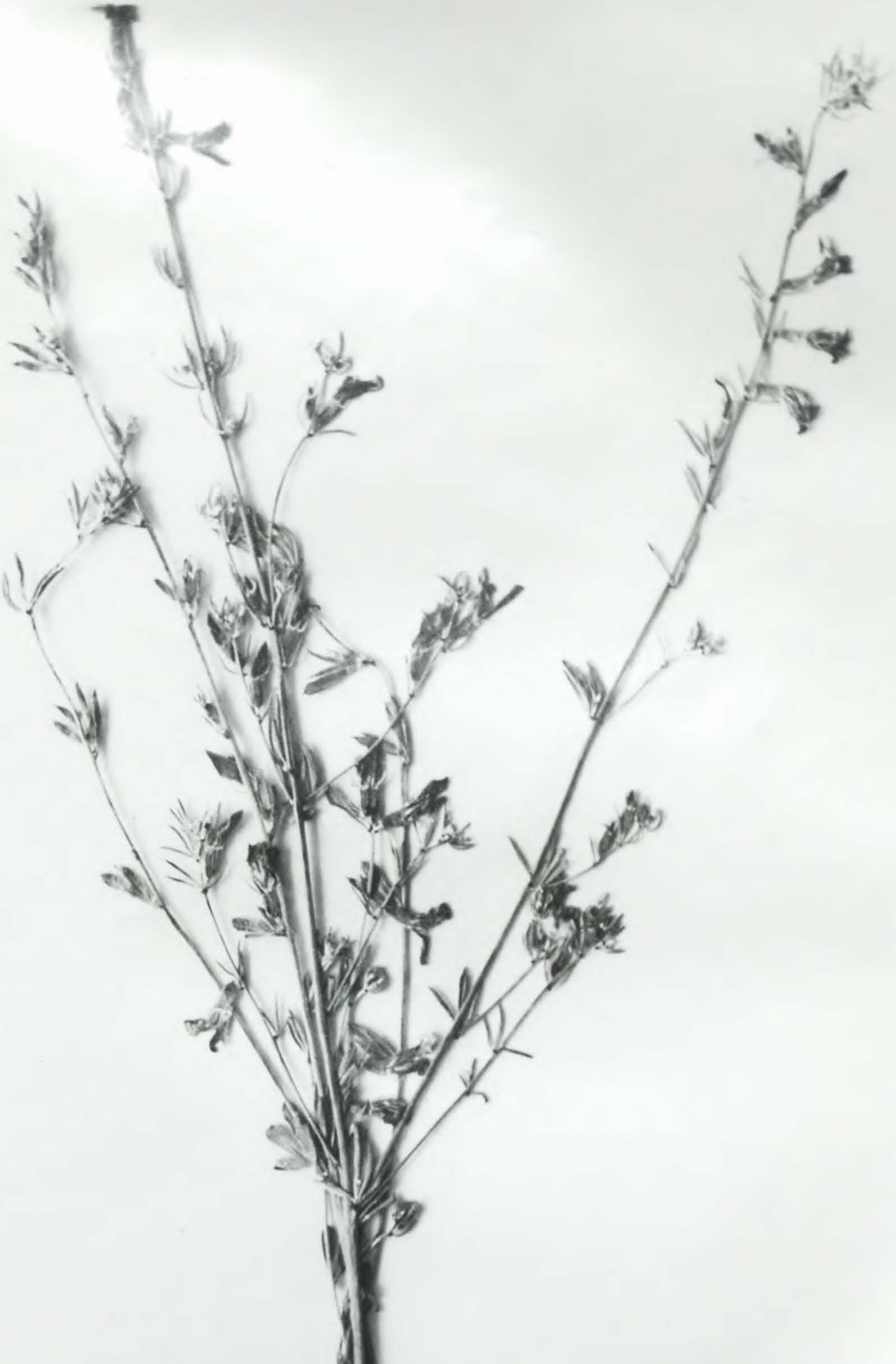
SITE #1 NORTH FORK
Arizona Oak
(Quercus arizonica)



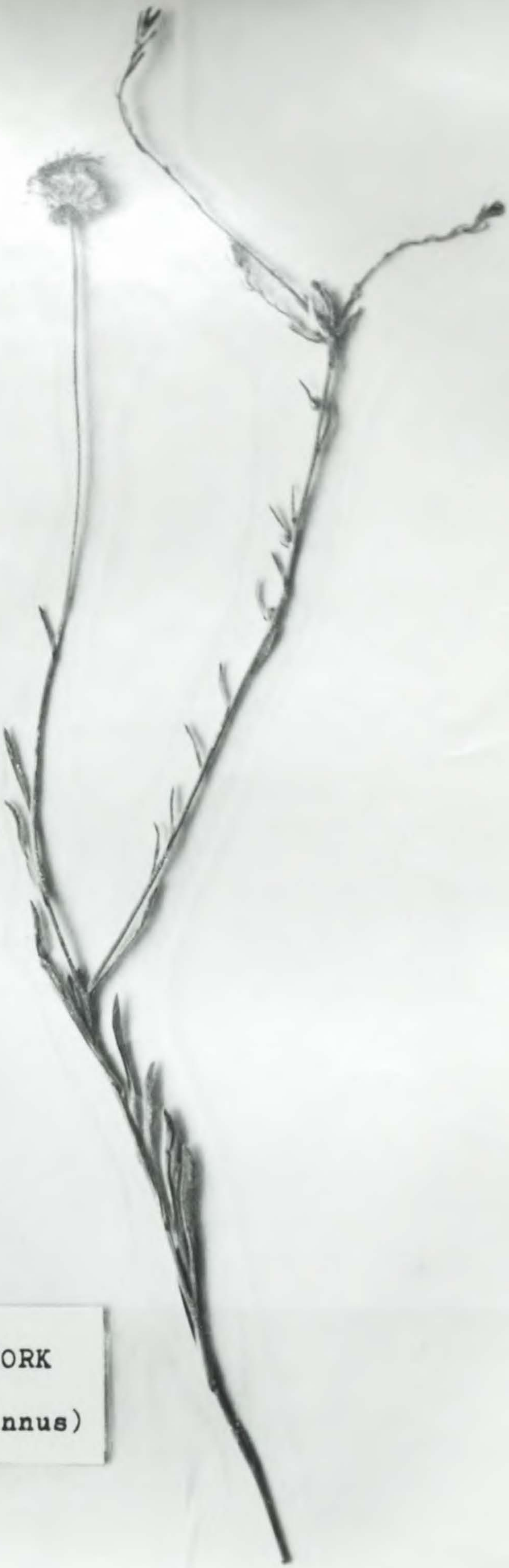
SITE #1 NORTH FORK
Beardlip Penstomen
(Penstomen barbatus)



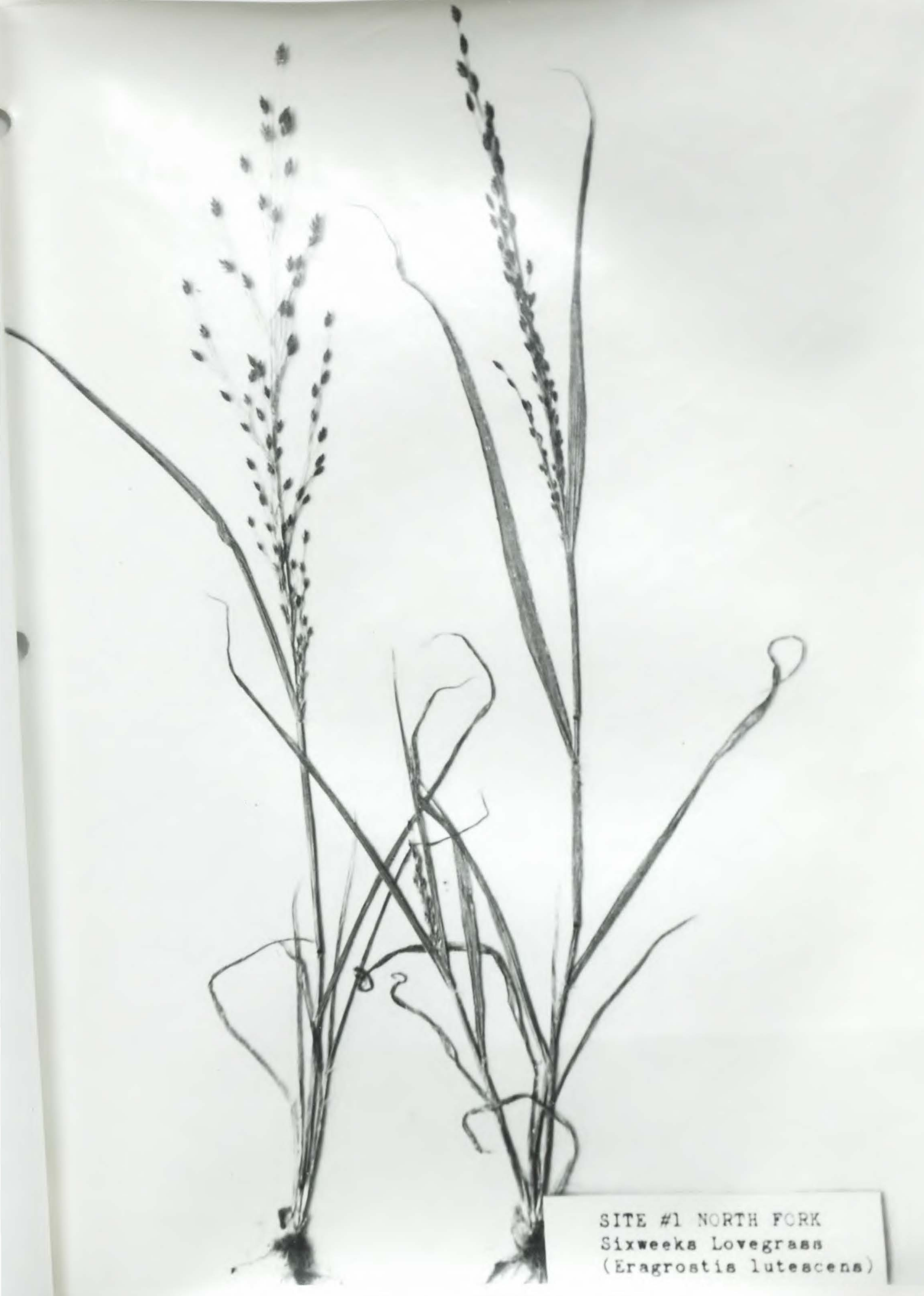
SITE #1 NORTH FORK
Orchard Grass
(Dactylis glomerata)



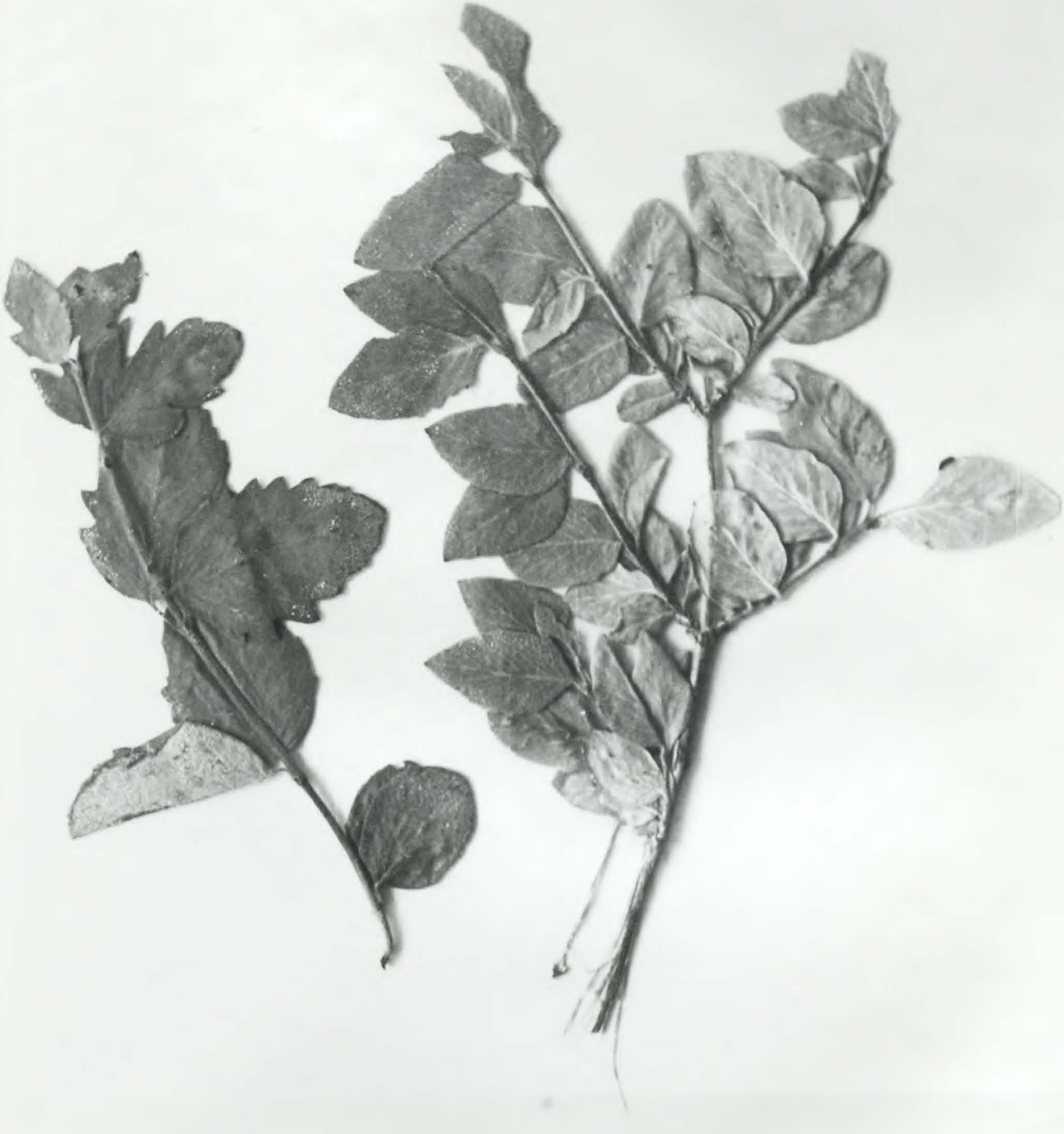
SITE #1 NORTH FORK
Red and Yellow Pea
(Lotus wrightii)



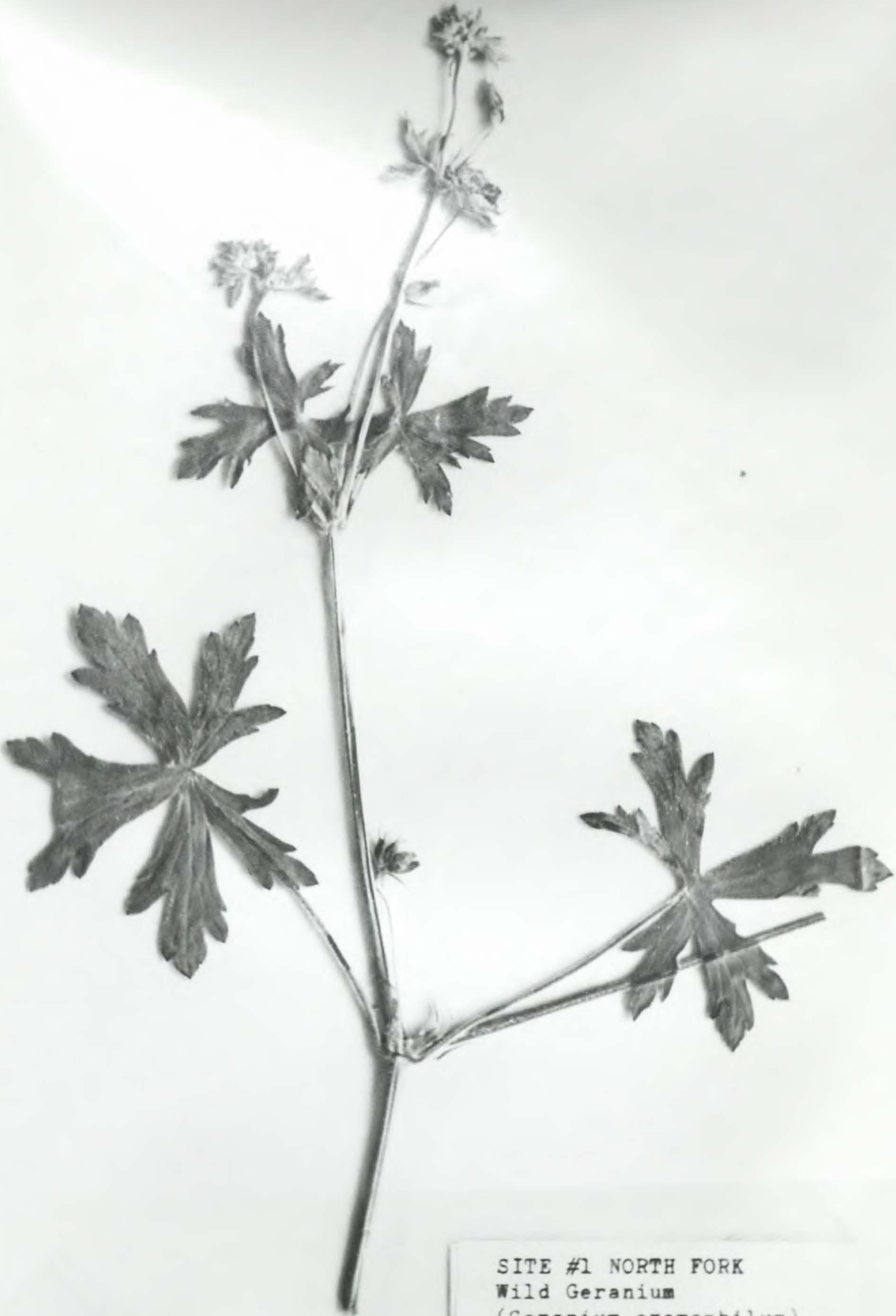
SITE #1 NORTH FORK
Hairy Fleabane
(Erigeron concinnus)



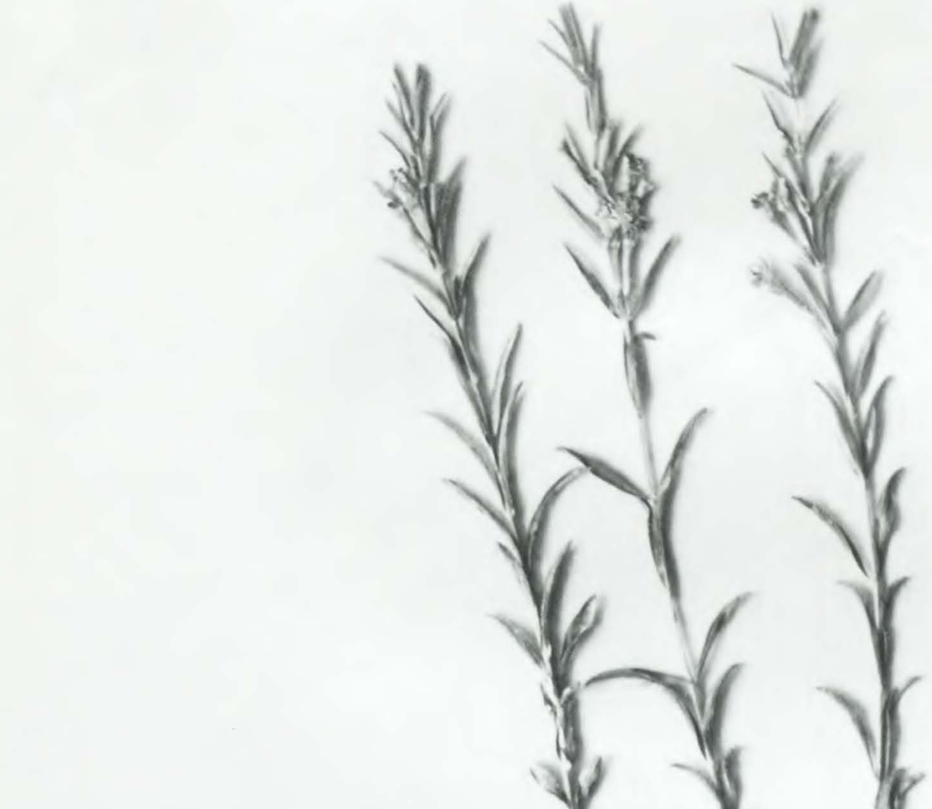
SITE #1 NORTH FORK
Sixweeks Lovegrass
(Eragrostis lutescens)



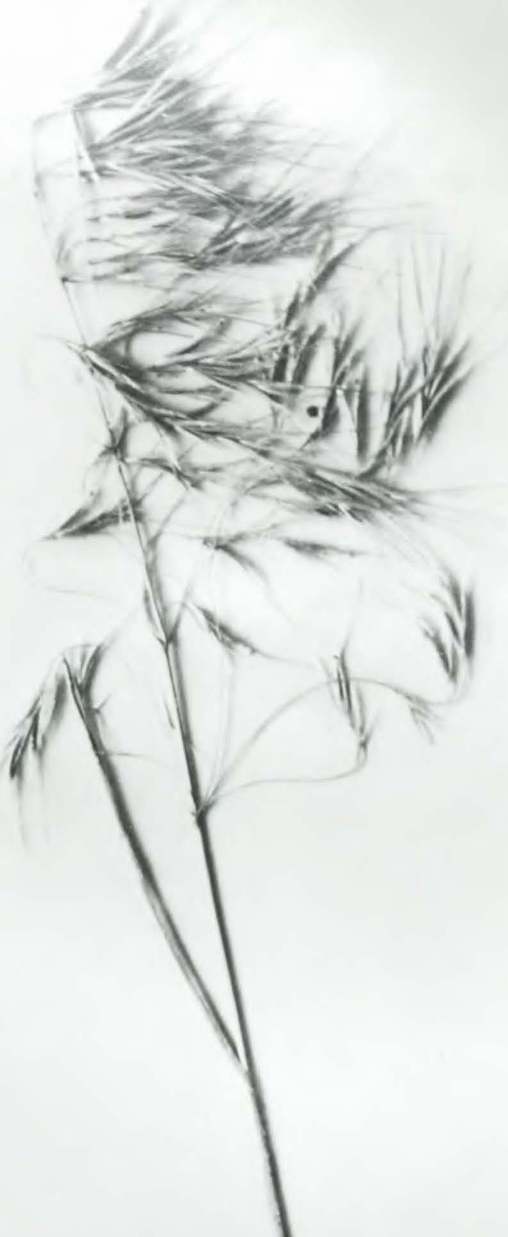
SITE #1 NORTH FORK
Roundleaf Snowberry
(Symphoricarpos rotundifolius)



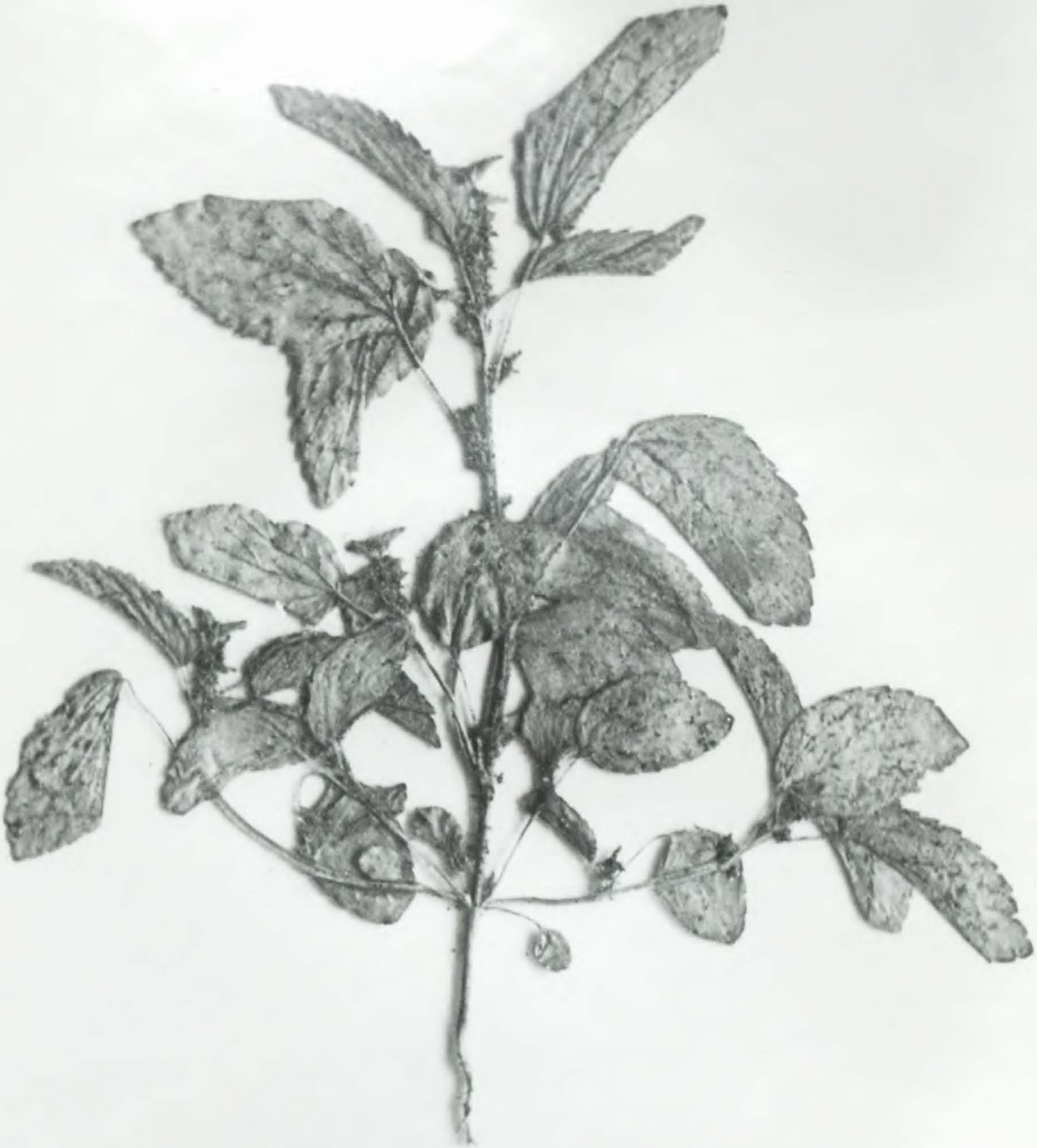
SITE #1 NORTH FORK
Wild Geranium
(Geranium eremophilum)



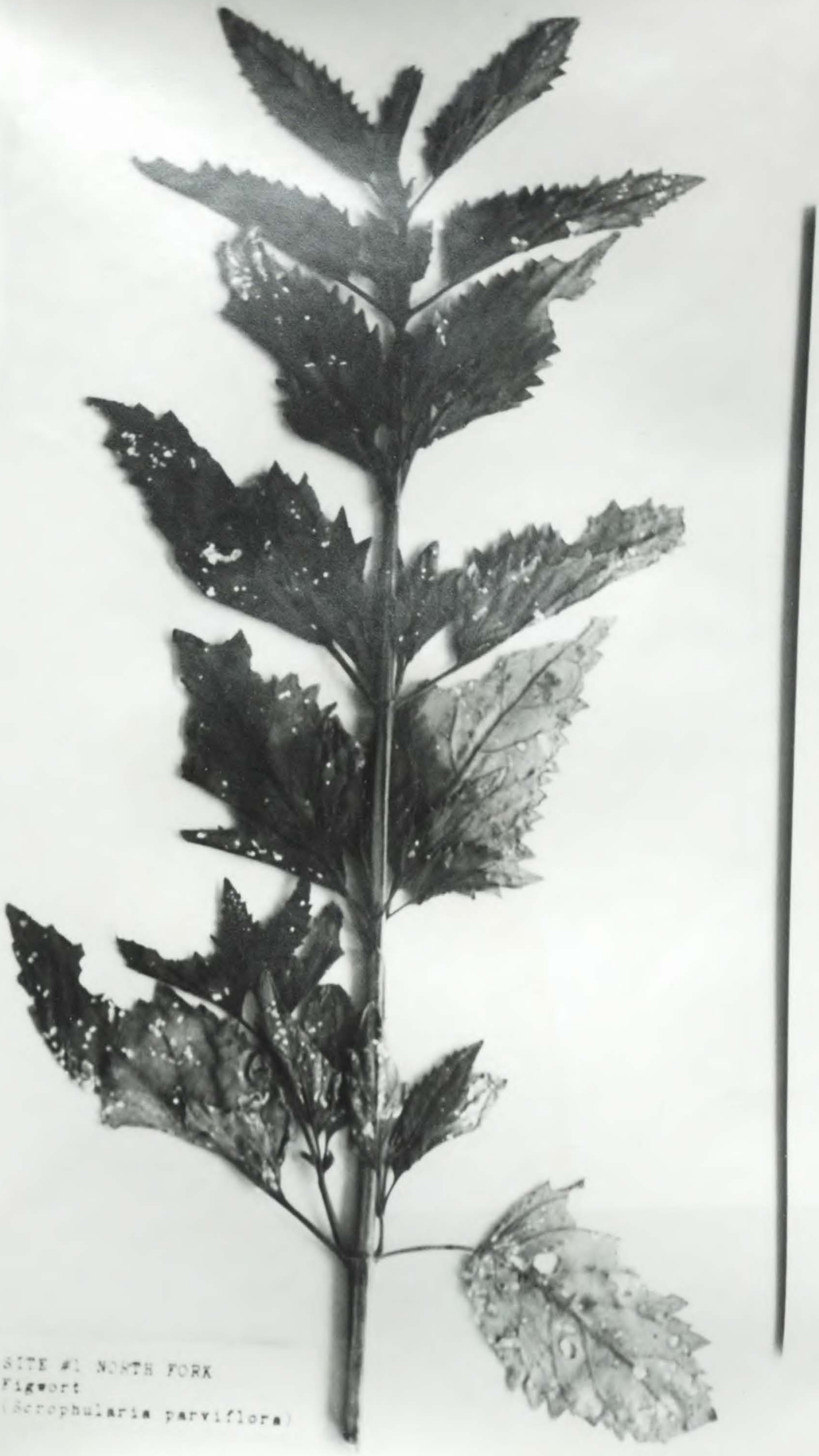
SITE #1 NORTH FORK
Mock-pennyroyal
(Hedeoma hyssopifolium)



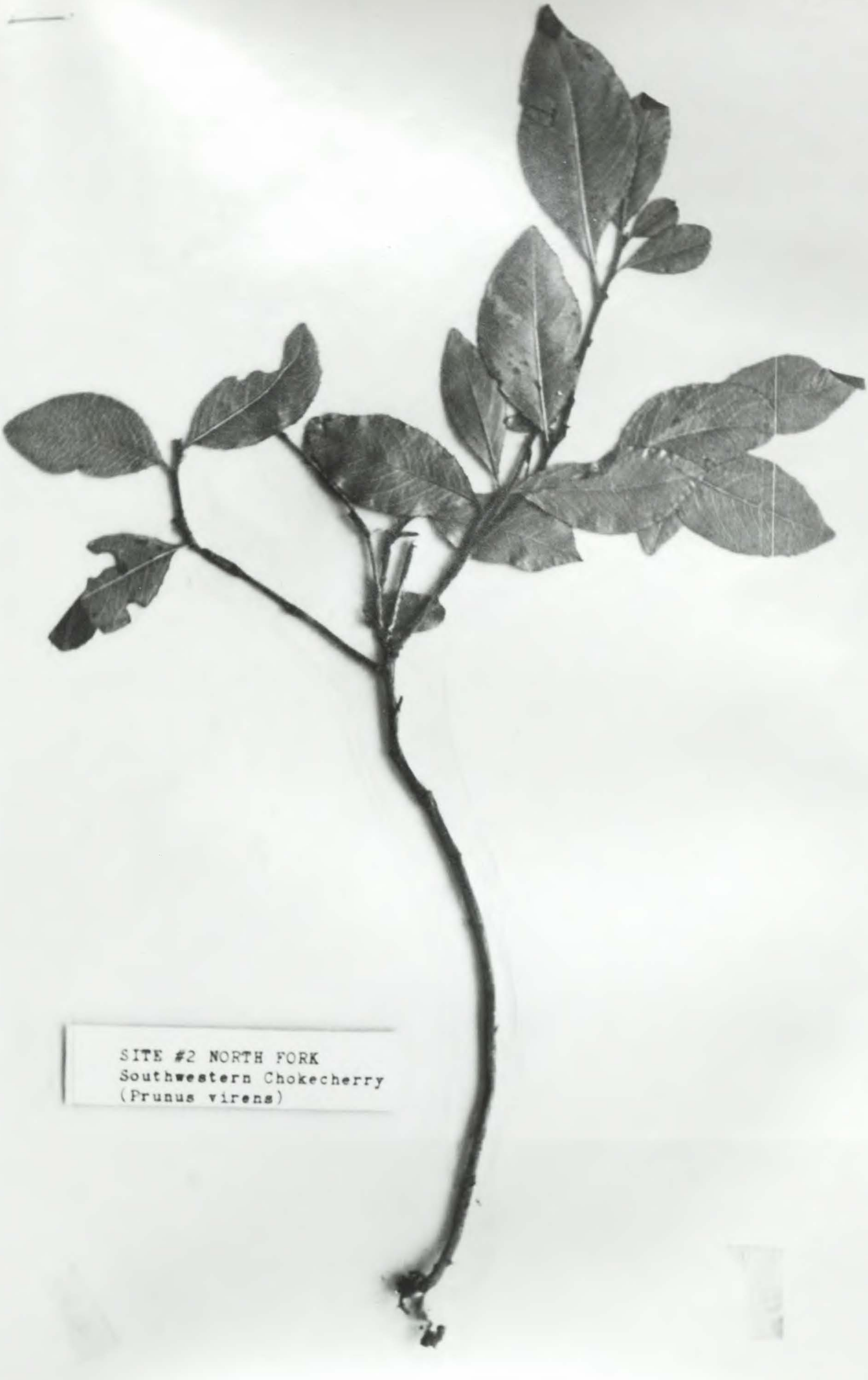
SITE #1 NORTH FORK
Cheat Grass
(Bromus tectorum)



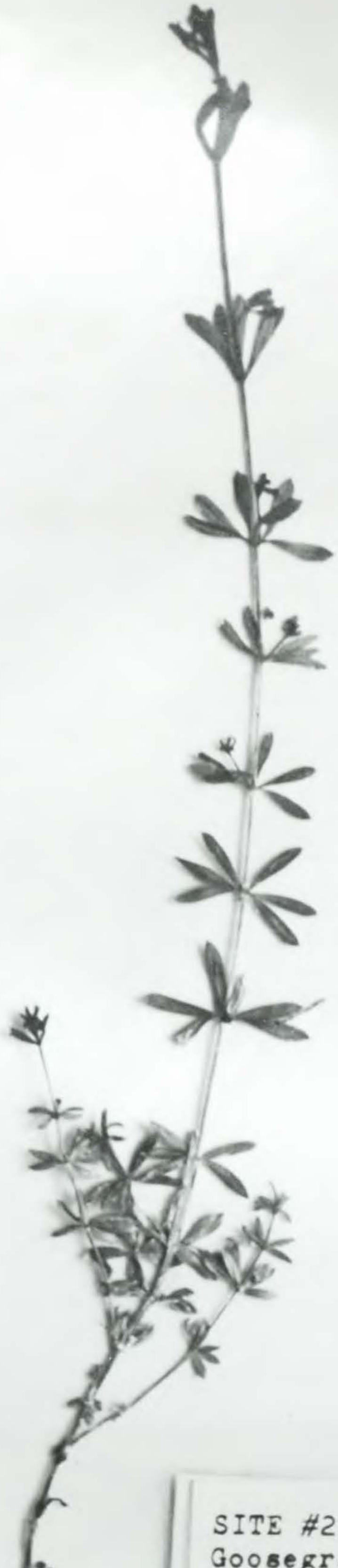
SITE #1 NORTH FORK
Acalypha
(Acalypha neomexicana)



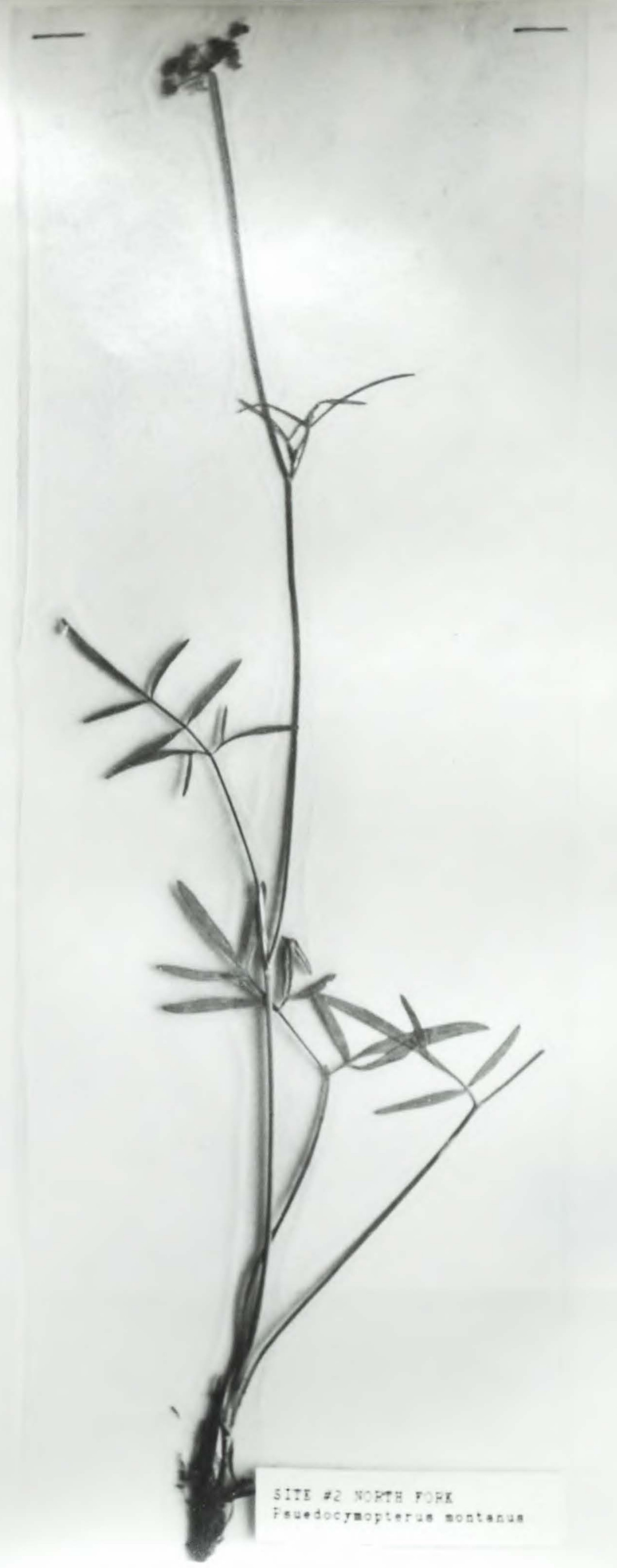
SITE #1 NORTH FORK
Figwort
(*Scrophularia parviflora*)



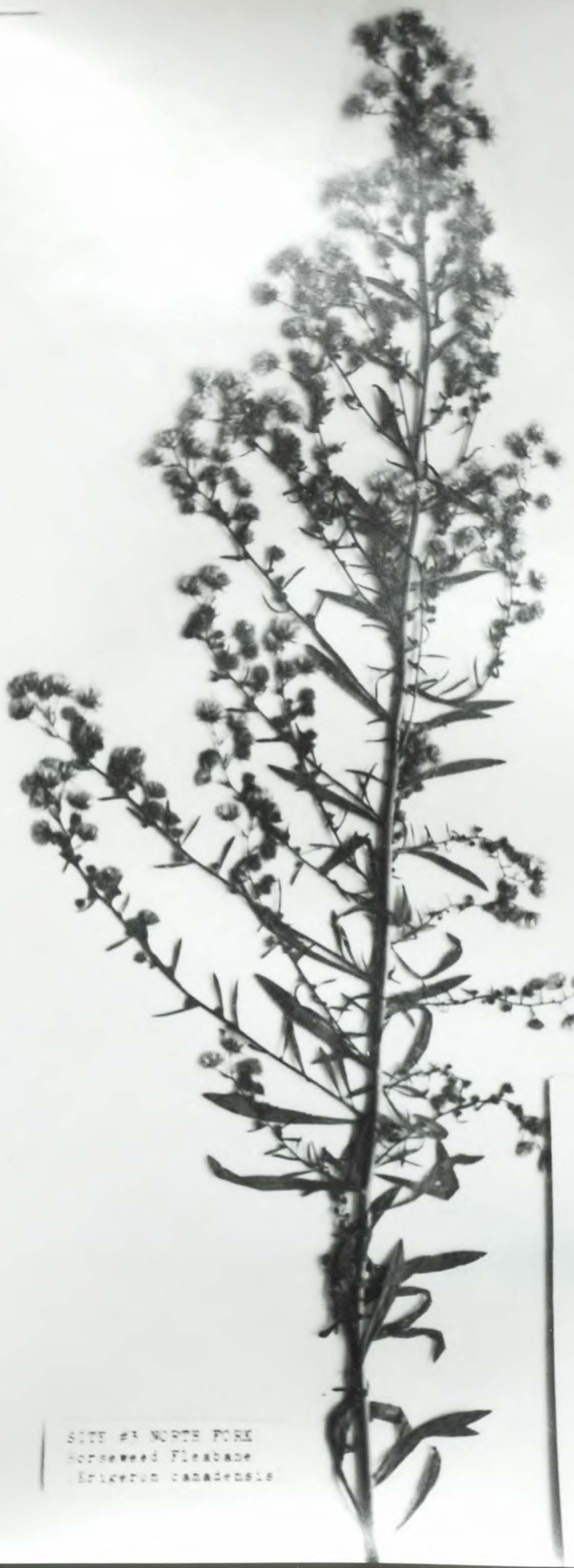
SITE #2 NORTH FORK
Southwestern Chokecherry
(Prunus virens)



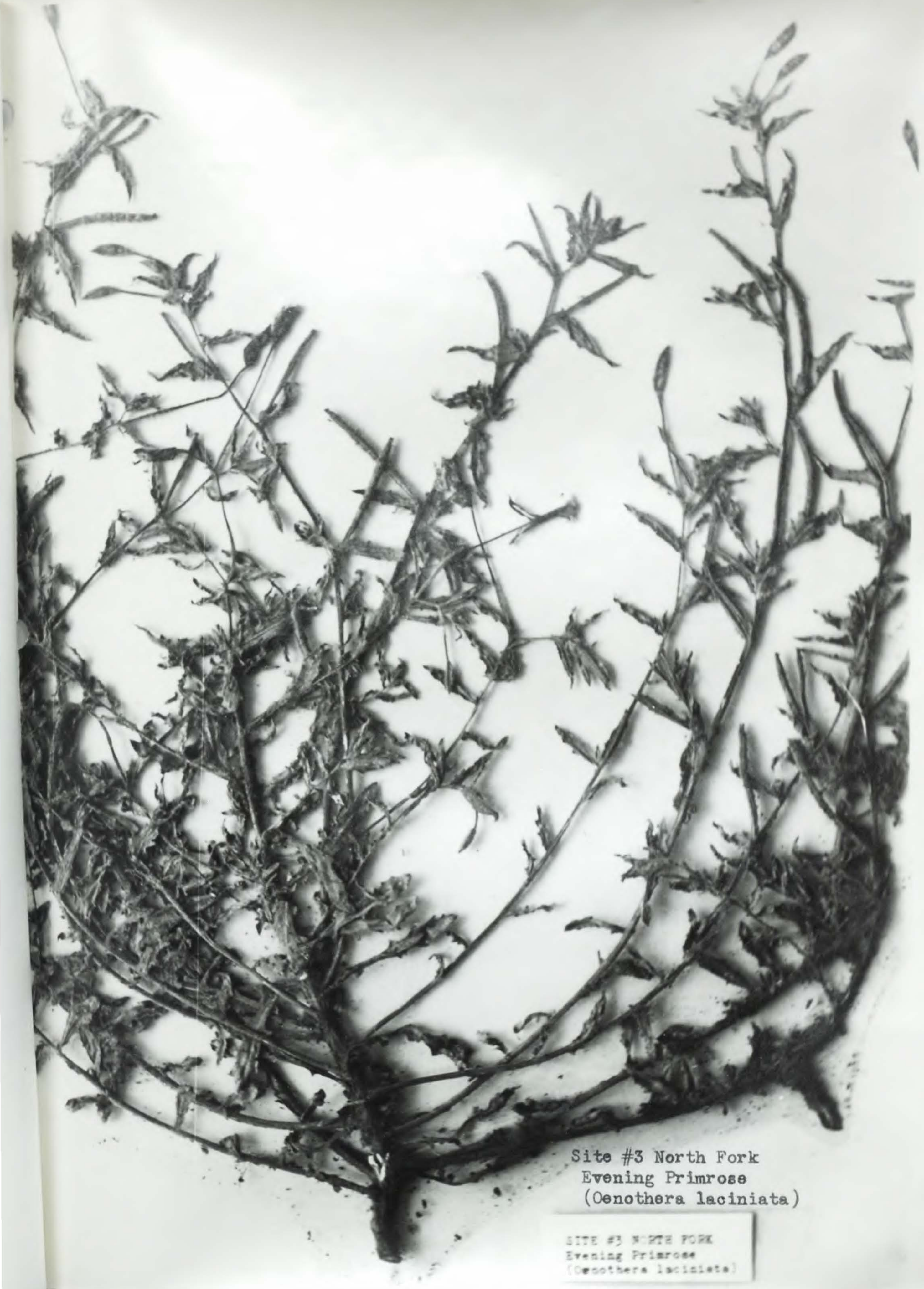
SITE #2 NORTH FORK
Goosegrass Bedstraw
(Galium aparine)



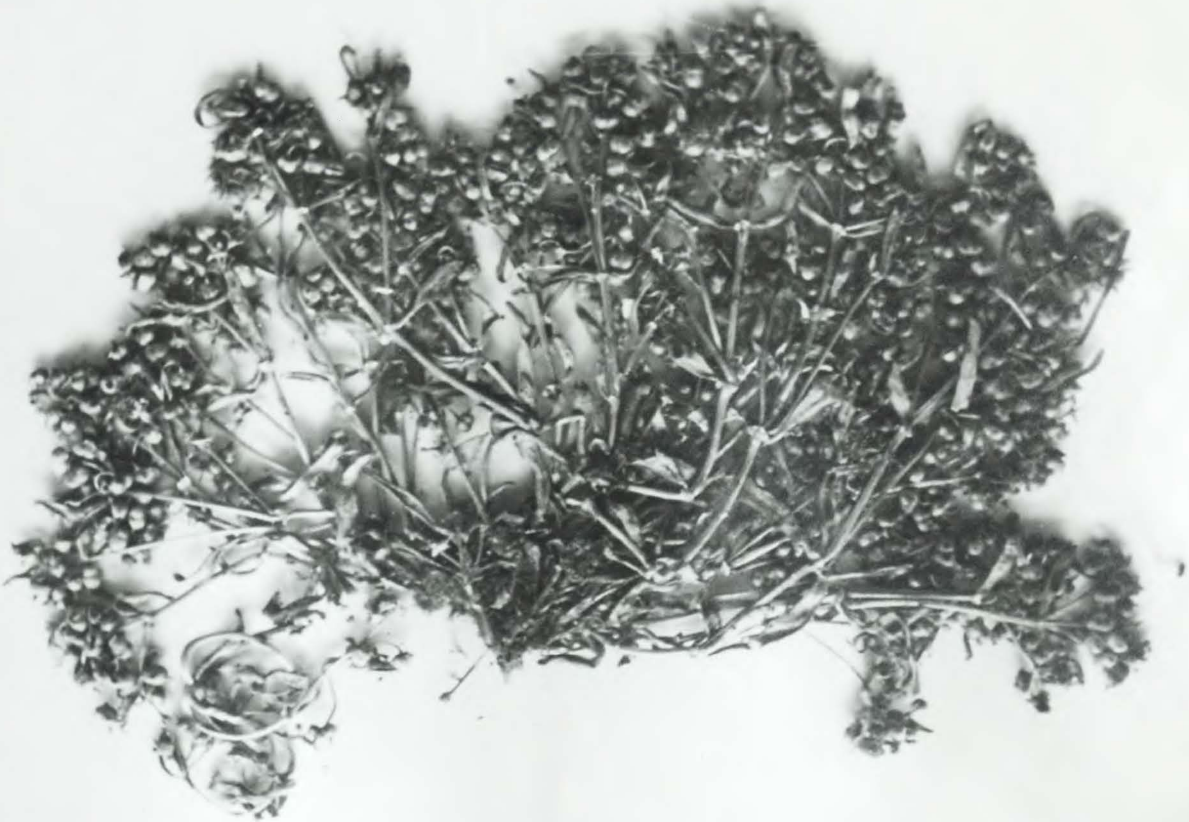
SITE #2 NORTH FORK
Psuedocymopterus montanus


SITE #3 NORTH FORK
Horseweed Fleabane
(Erigeron canadensis

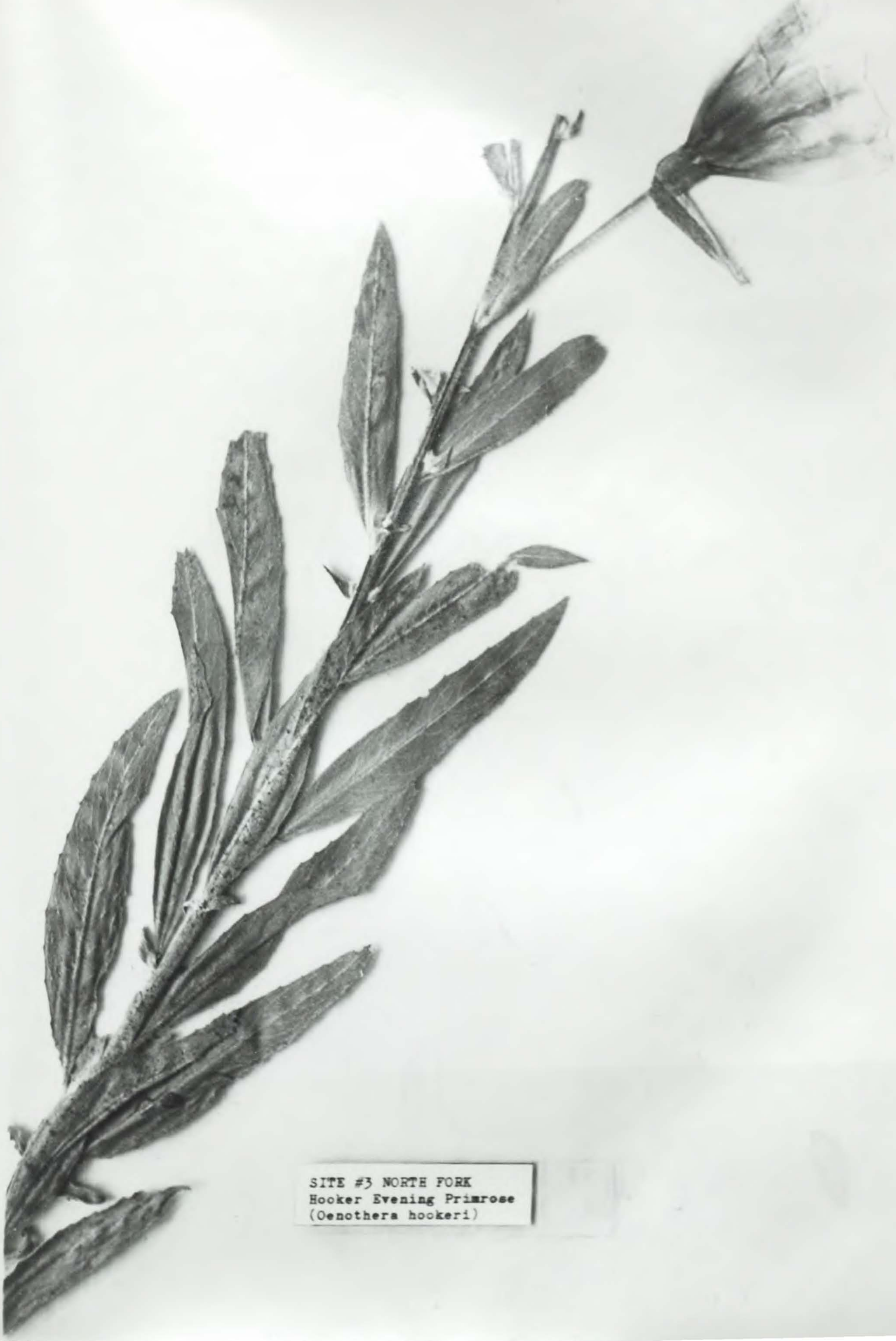
Site #3 NORTH FORK
Horseweed Fleabane
(Erigeron canadensis)


SITE #3 NORTH FORK
Evening Primrose
(Oenothera laciniata)

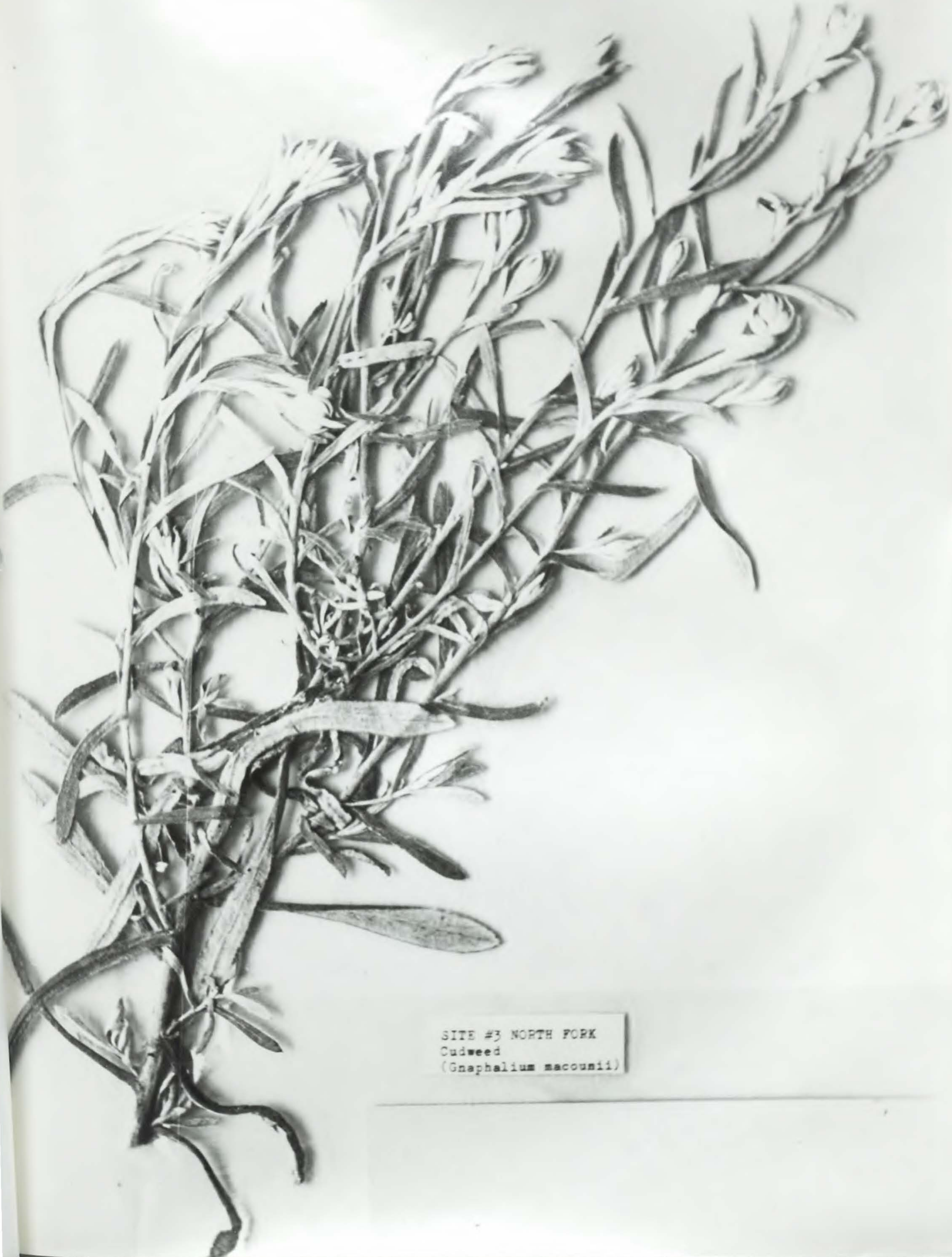
Site #3 North Fork
Evening Primrose
(Oenothera laciniata)



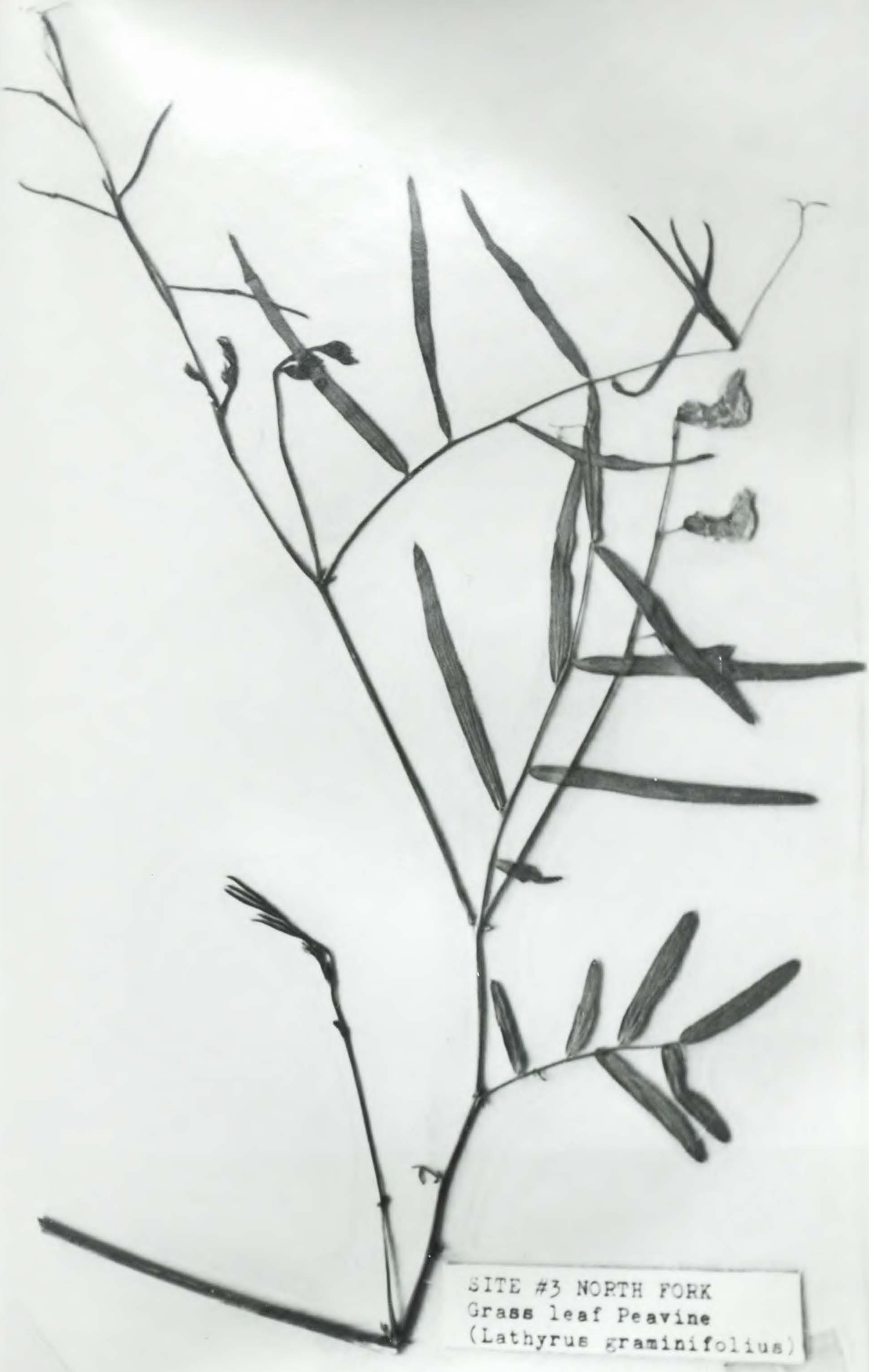
SITE #3 NORTH FORK
Madder family
(Houstonia wrightii)



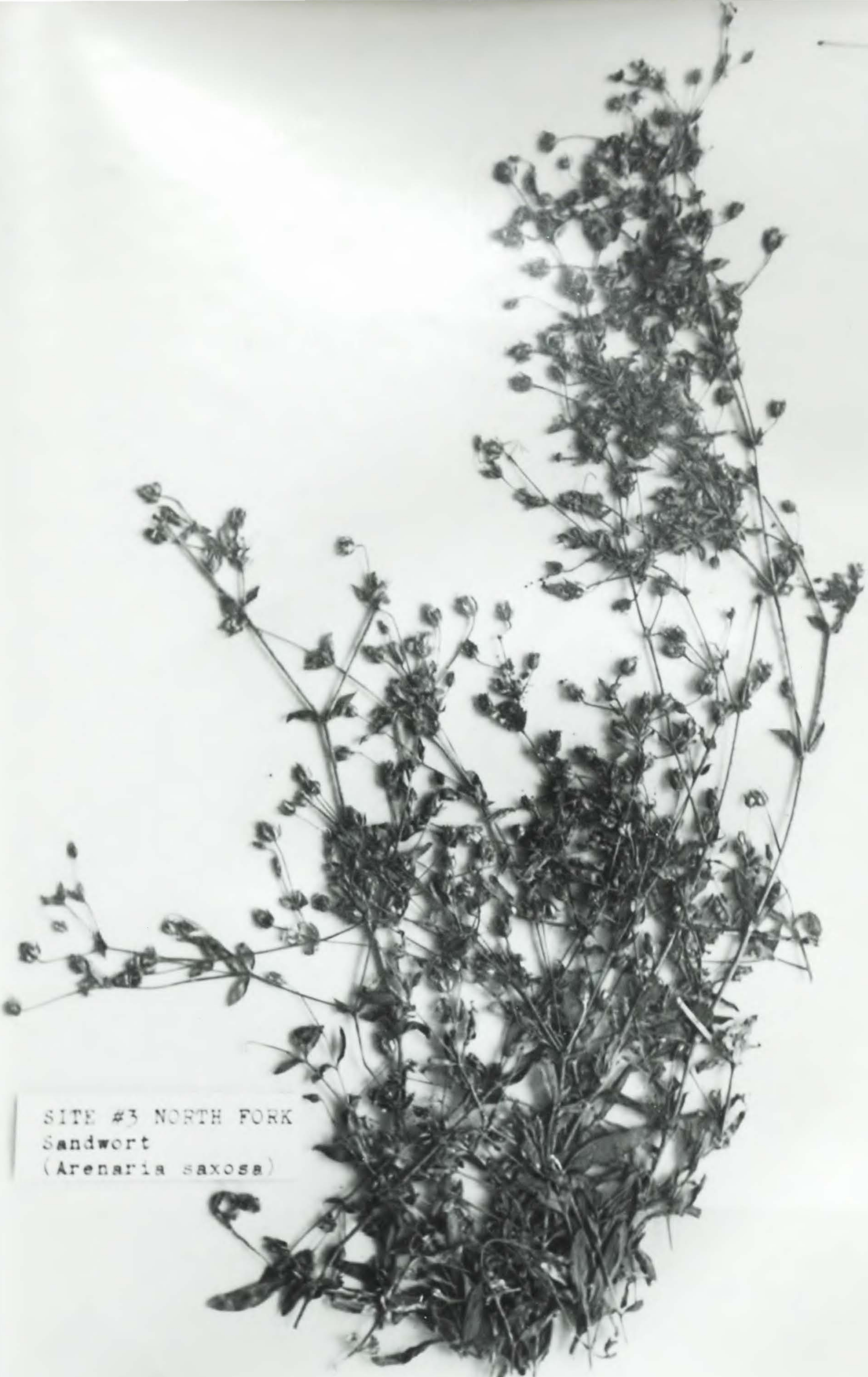
SITE #3 NORTH FORK
Hooker Evening Primrose
(Oenothera hookeri)



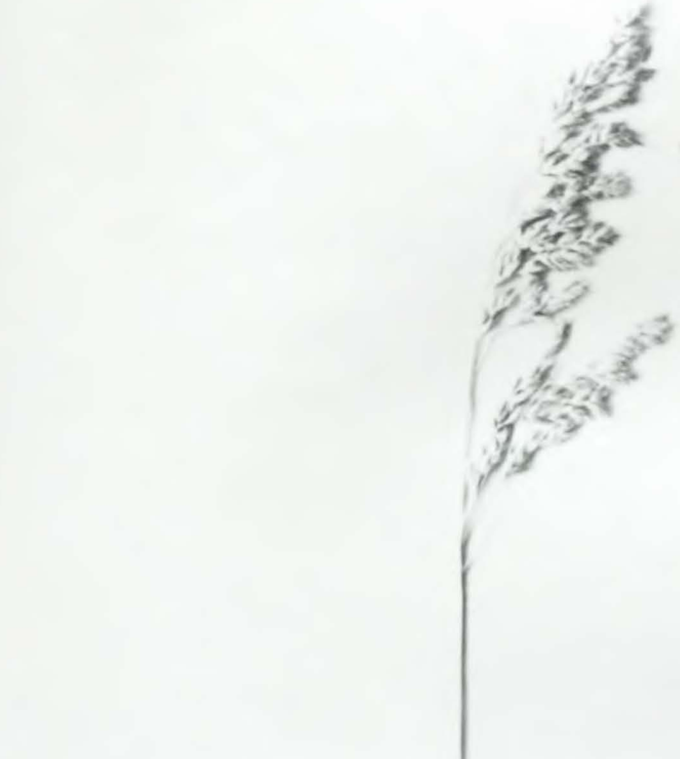
SITE #3 NORTH FORK
Cudweed
(Gnaphalium macounii)



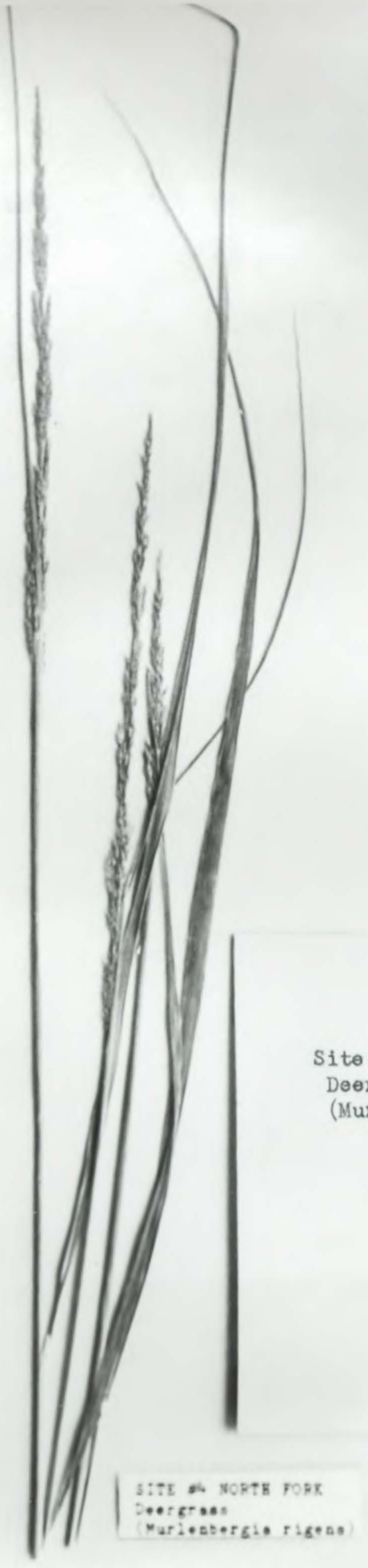
SITE #3 NORTH FORK
Grass leaf Peavine
(Lathyrus graminifolius)



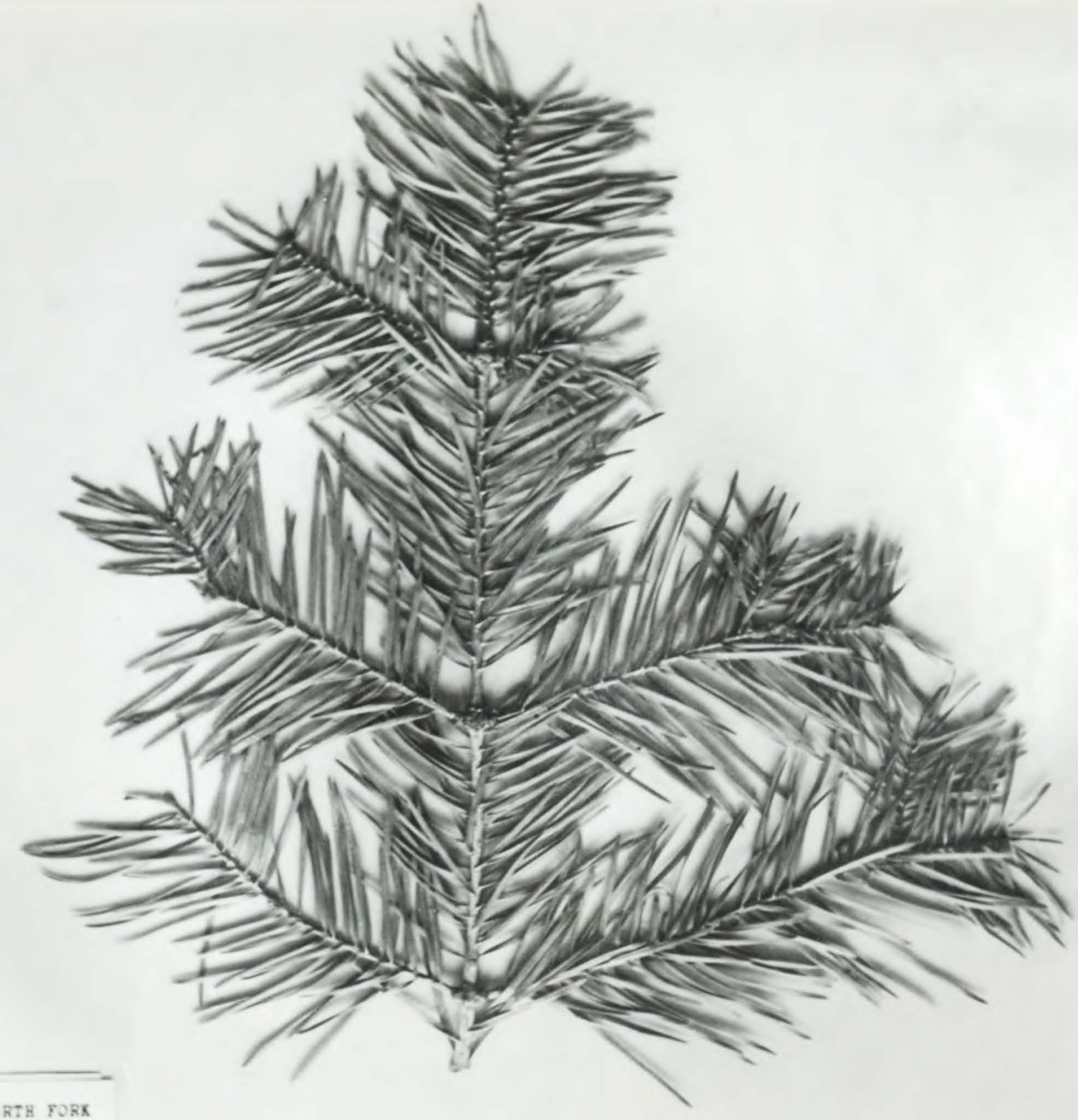
SITE #3 NORTH FORK
Sandwort
(Arenaria saxosa)



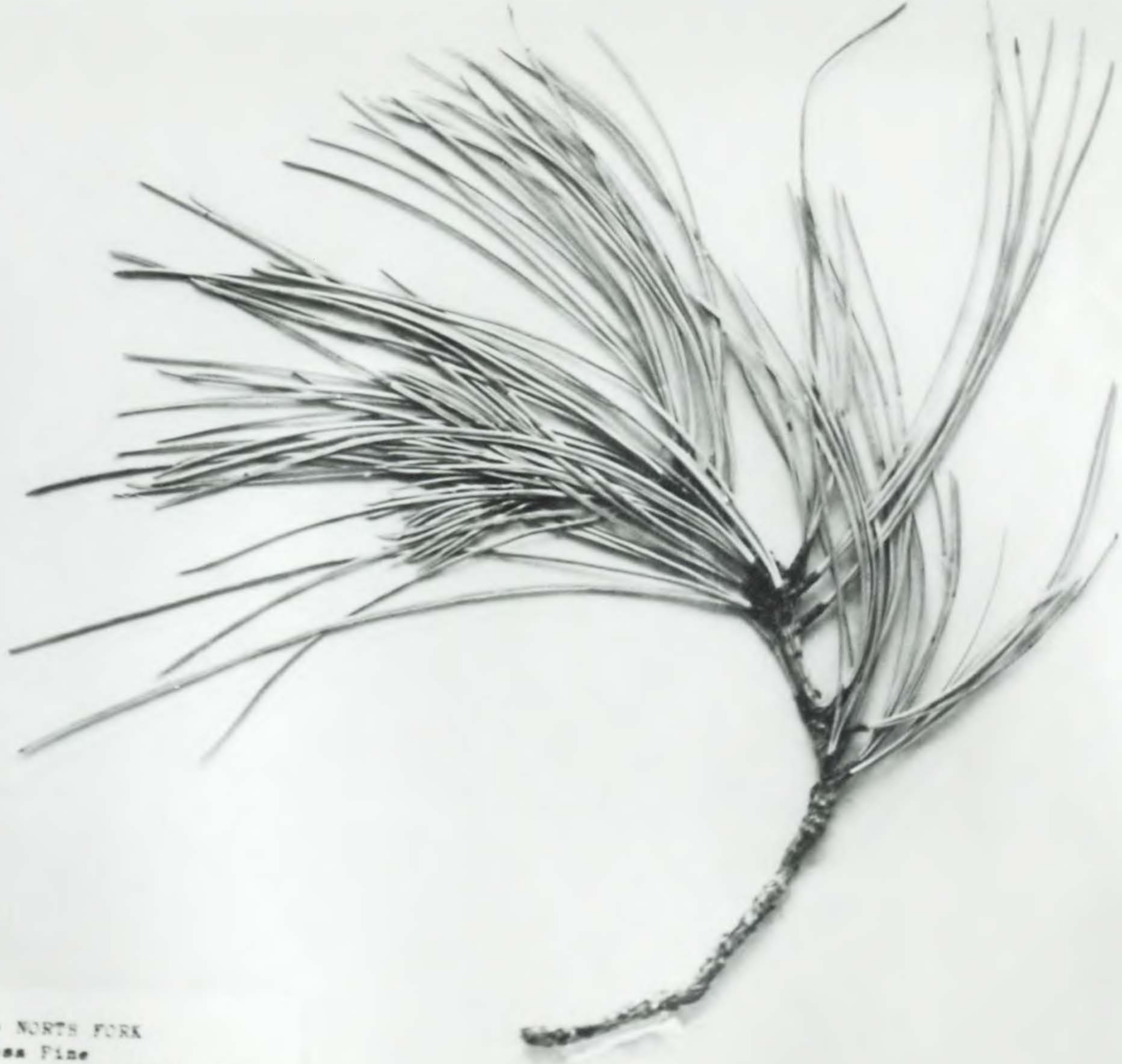
SITE #3 NORTH FORK
Mutton Bluegrass
(Poa Fendleriana)


SITE #4 NORTH FORK
Deergrass
(Murlenbergia rigens)

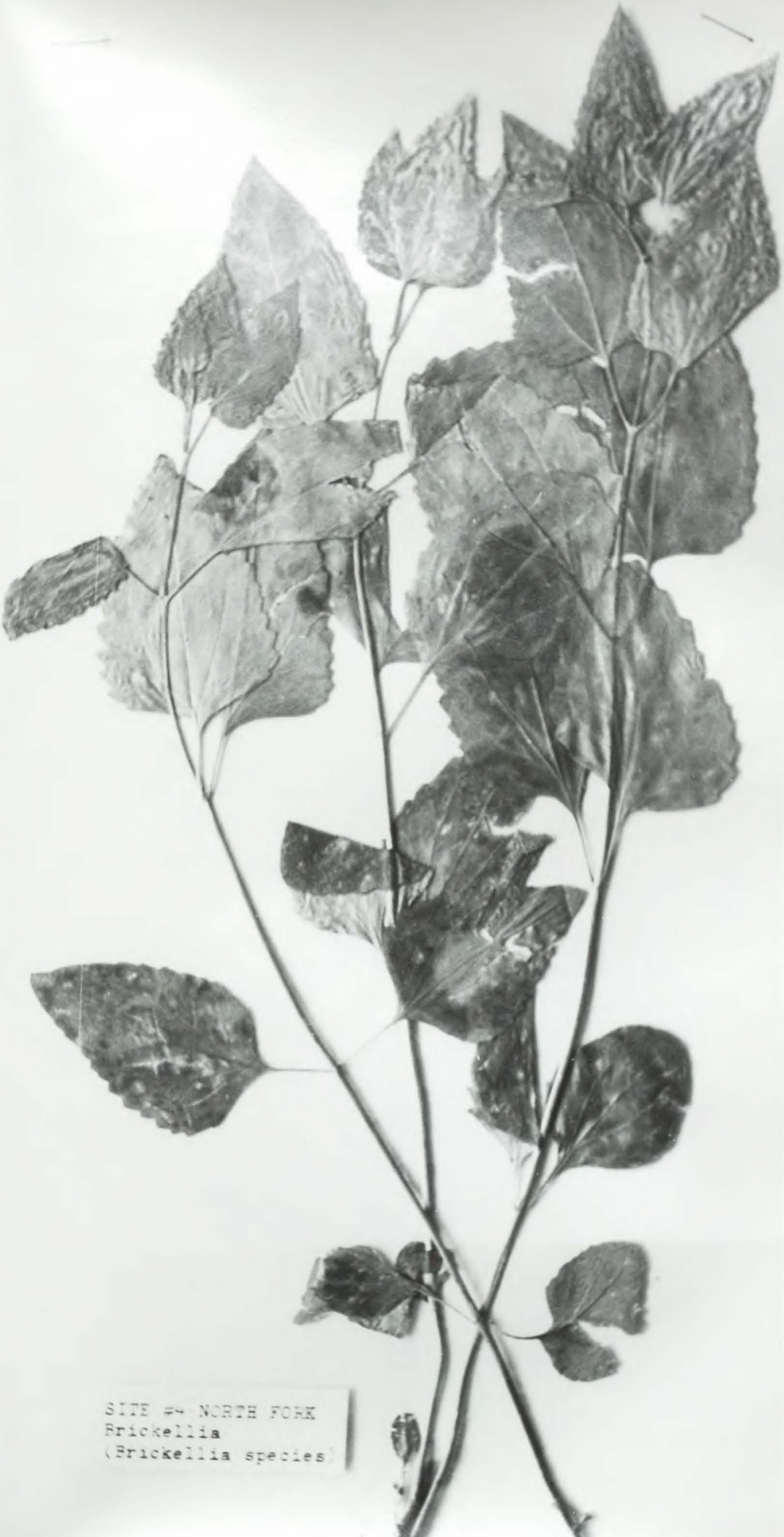
Site #4 NORTH FORK
Deergrass
(Murlenbergia rigens)



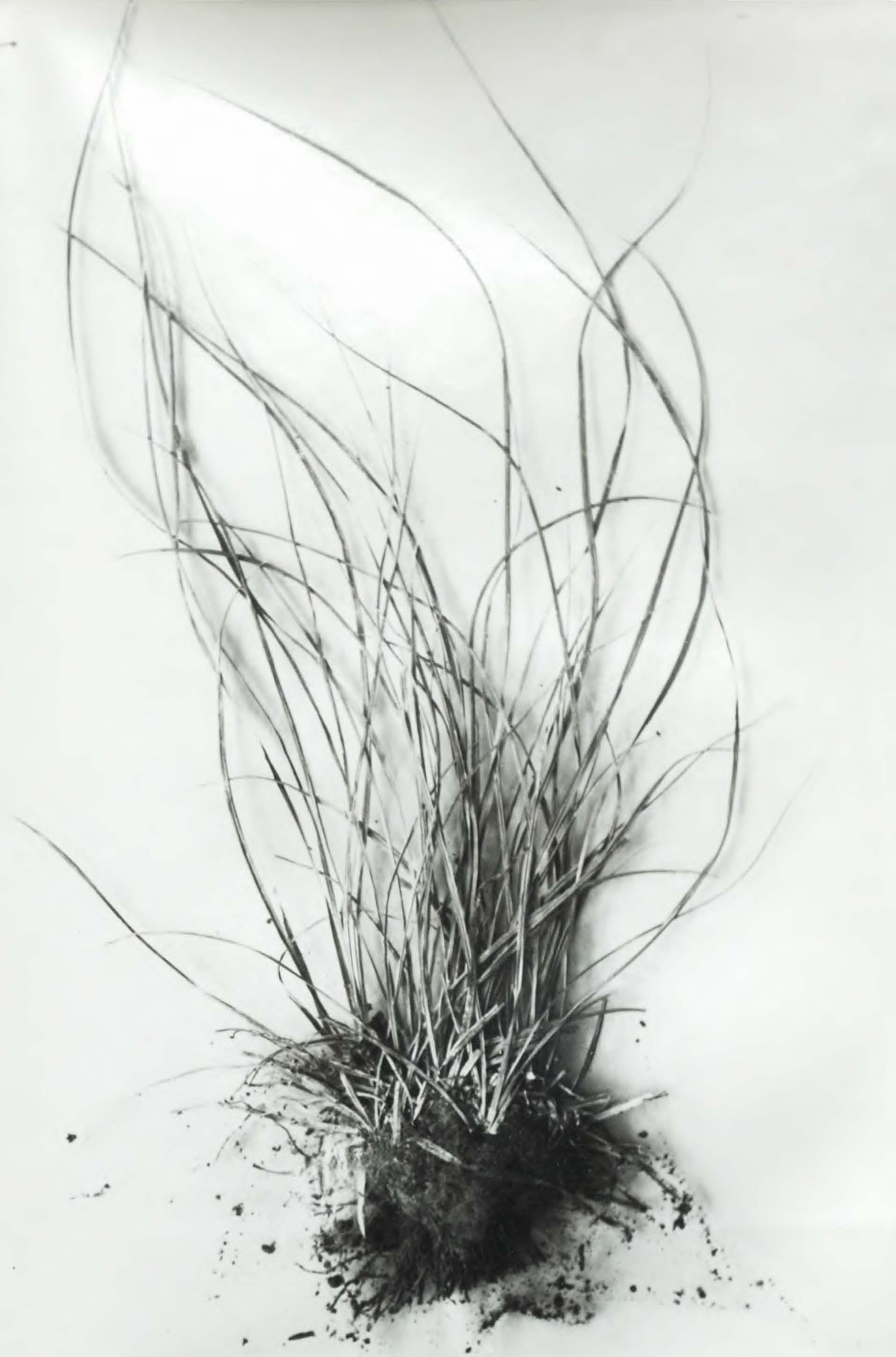
SITE #4 NORTH FORK
White Fir
(Abies concolor)



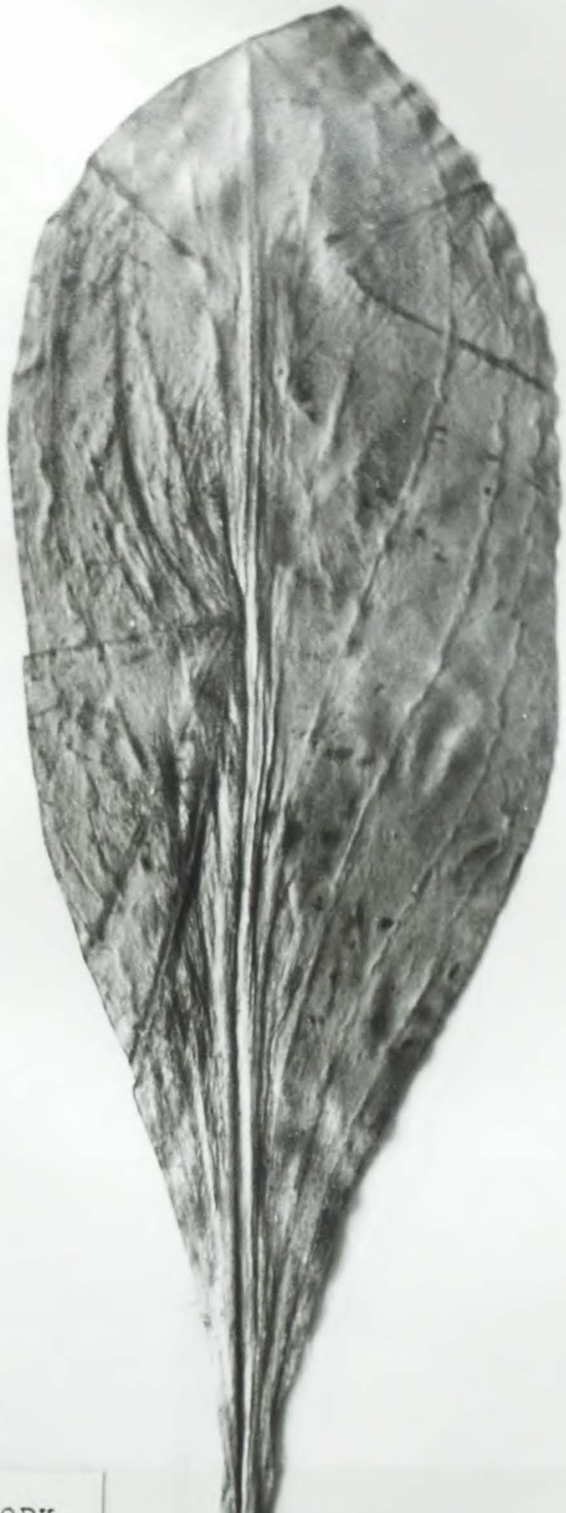
SITE #4 NORTH FORK
Ponderosa Pine
(Pinus ponderosa arizonica)



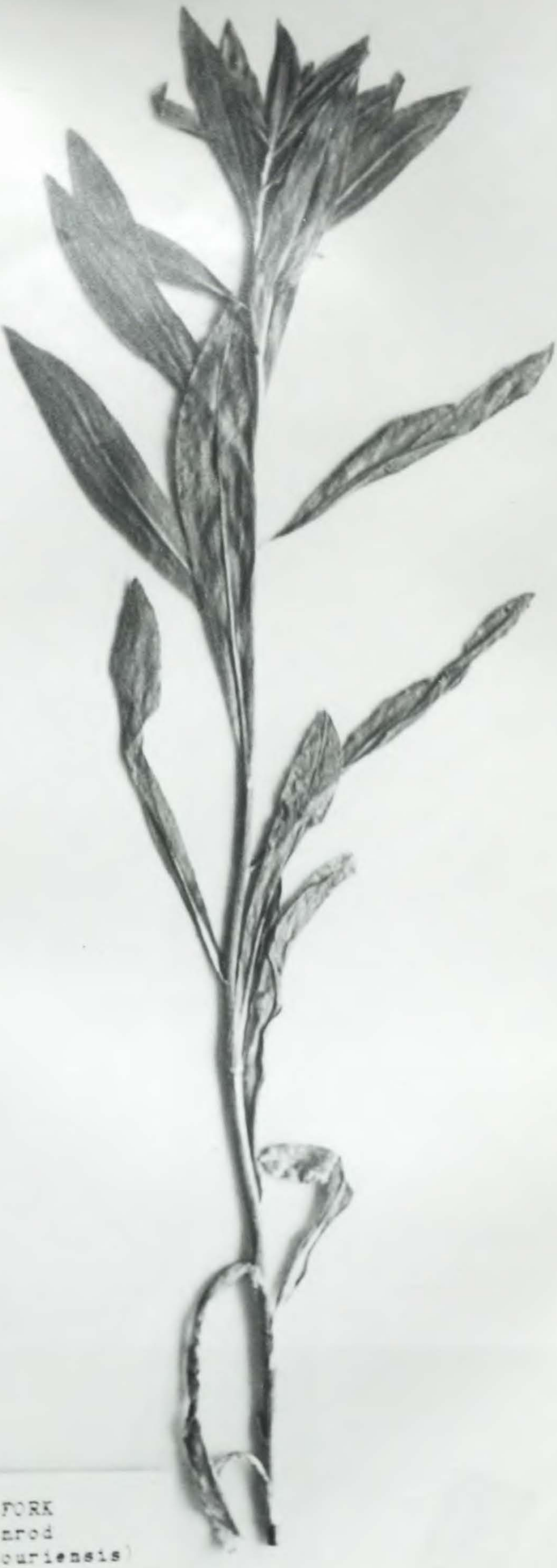
SITE #4 NORTH FORK
Brickellia
(Brickellia species)



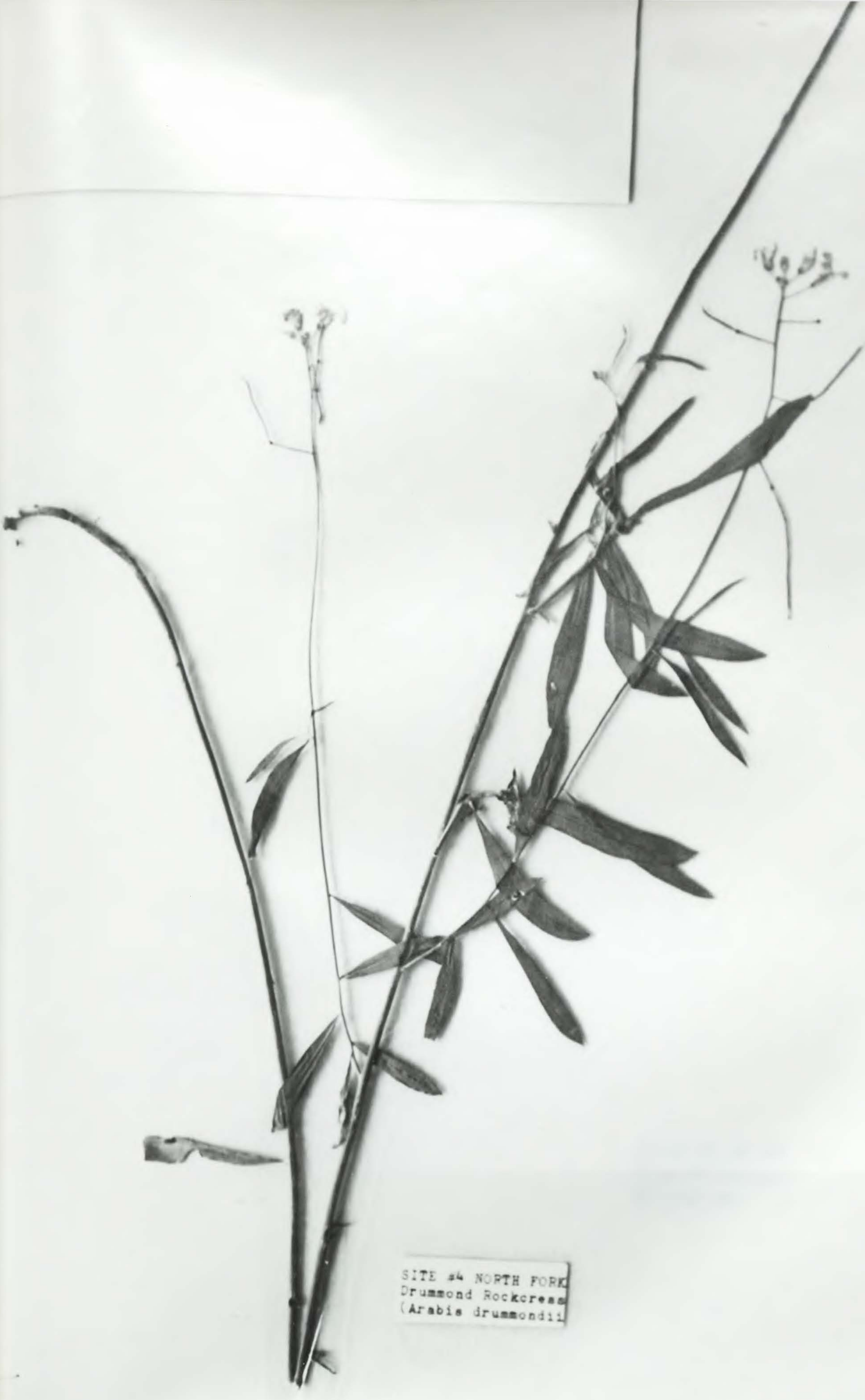
SITE #4 NORTH FORK
Dryland Sedge
(Carex geophila)



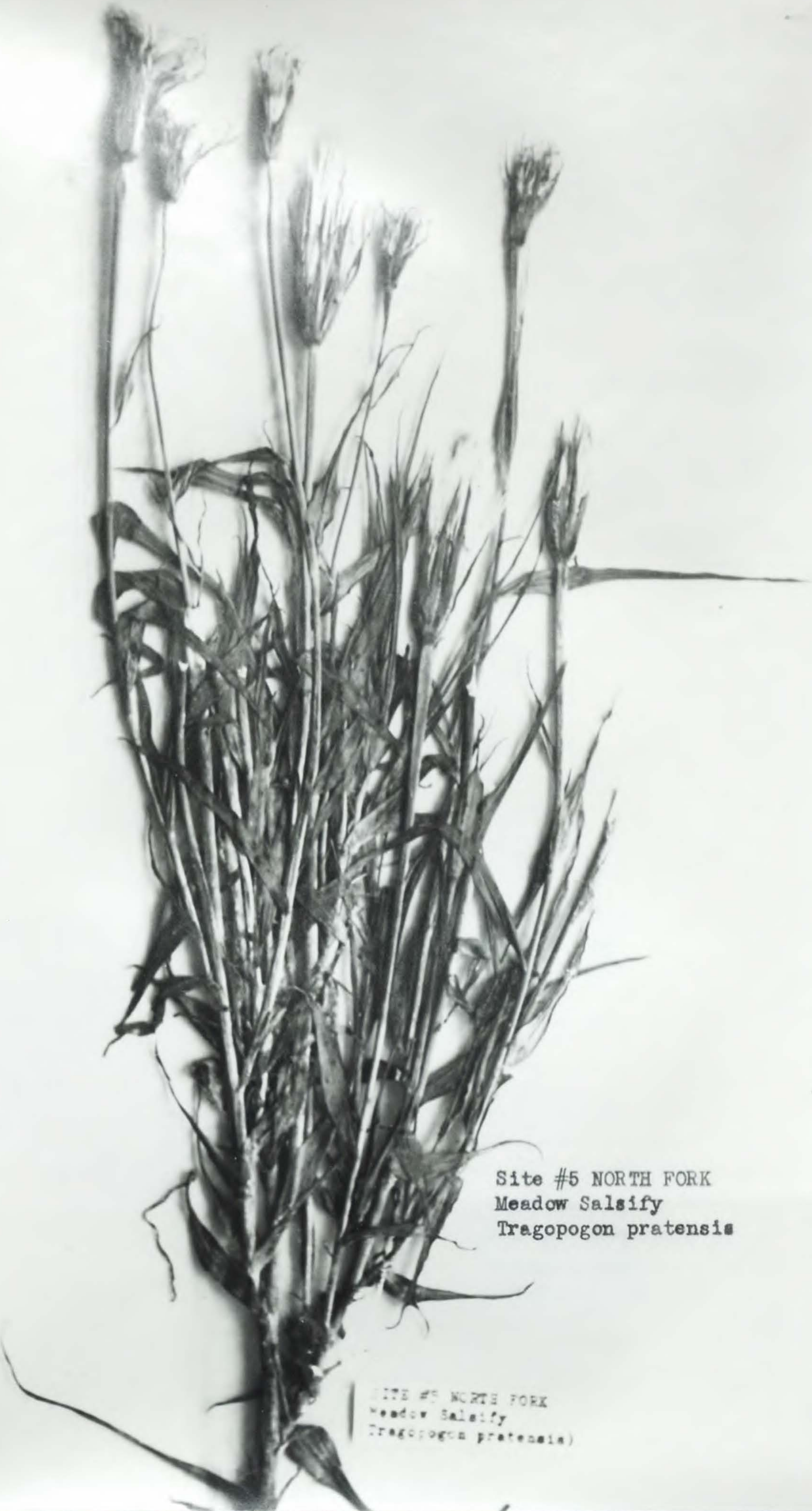
SITE #4 NORTH FORK
Deers-ears Swertia
(Swertia radiata)



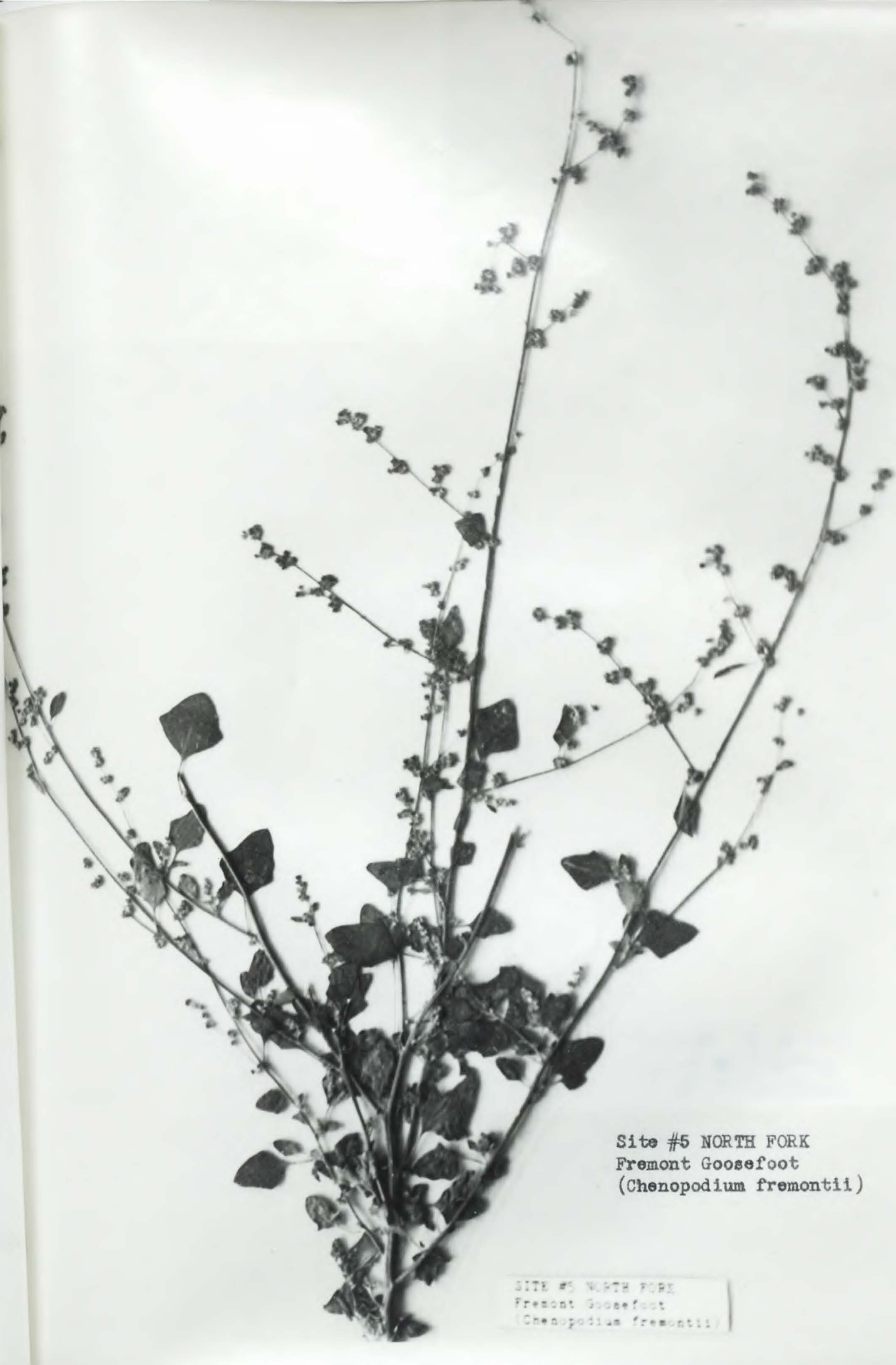
SITE #4 NORTH FORK
Missouri Goldenrod
(Solidago missouriensis)



SITE #4 NORTH FORK
Drummond Rockcress
(Arabis drummondii


SITE #5 NORTH FORK
Meadow Salsify
(Tragopogon pratensis)

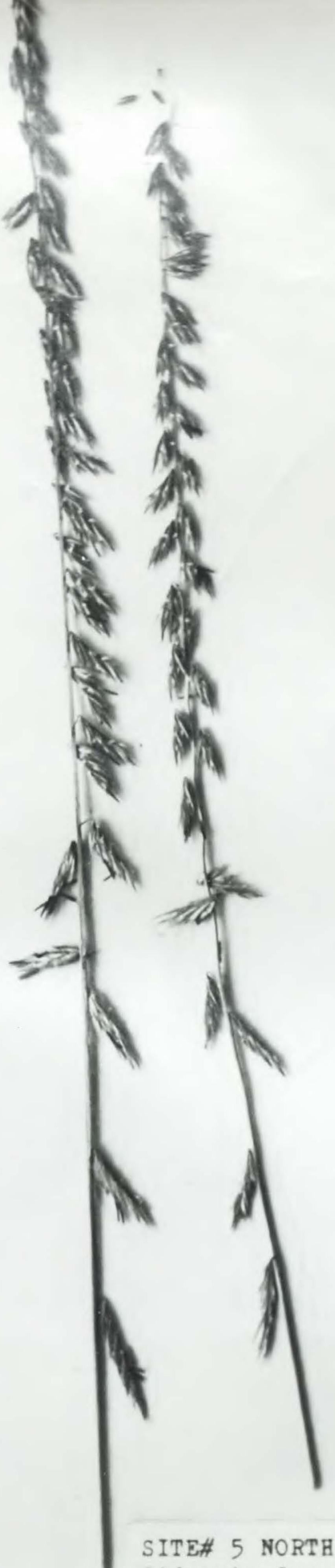
Site #5 NORTH FORK
Meadow Salsify
Tragopogon pratensis


SITE #5 NORTH FORK
Fremont Goosefoot
(Chenopodium fremontii)

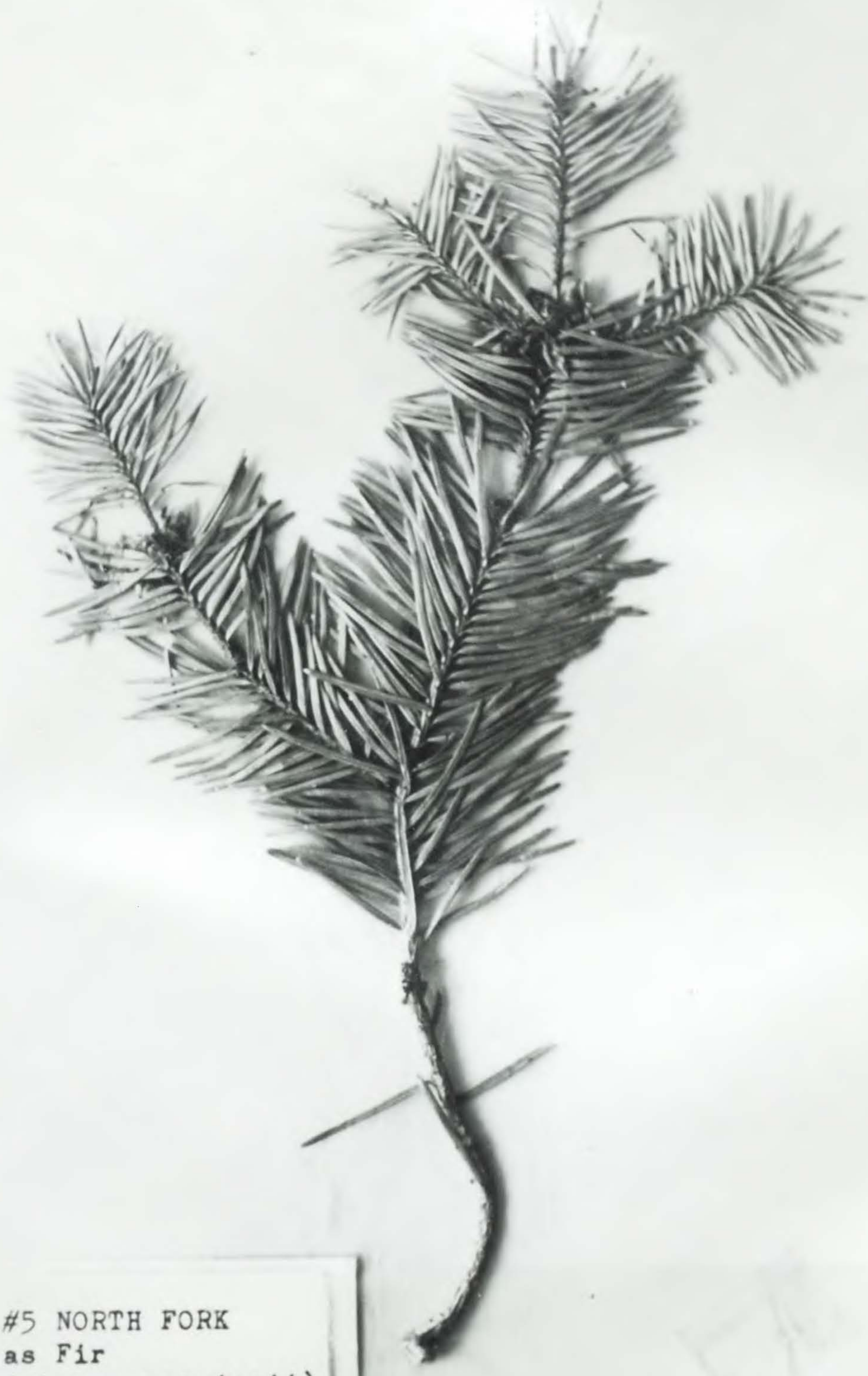
Site #5 NORTH FORK
Fremont Goosefoot
(Chenopodium fremontii)

SITE #5 NORTH FORK
Buckbrush
(Ceanothus fendleri)

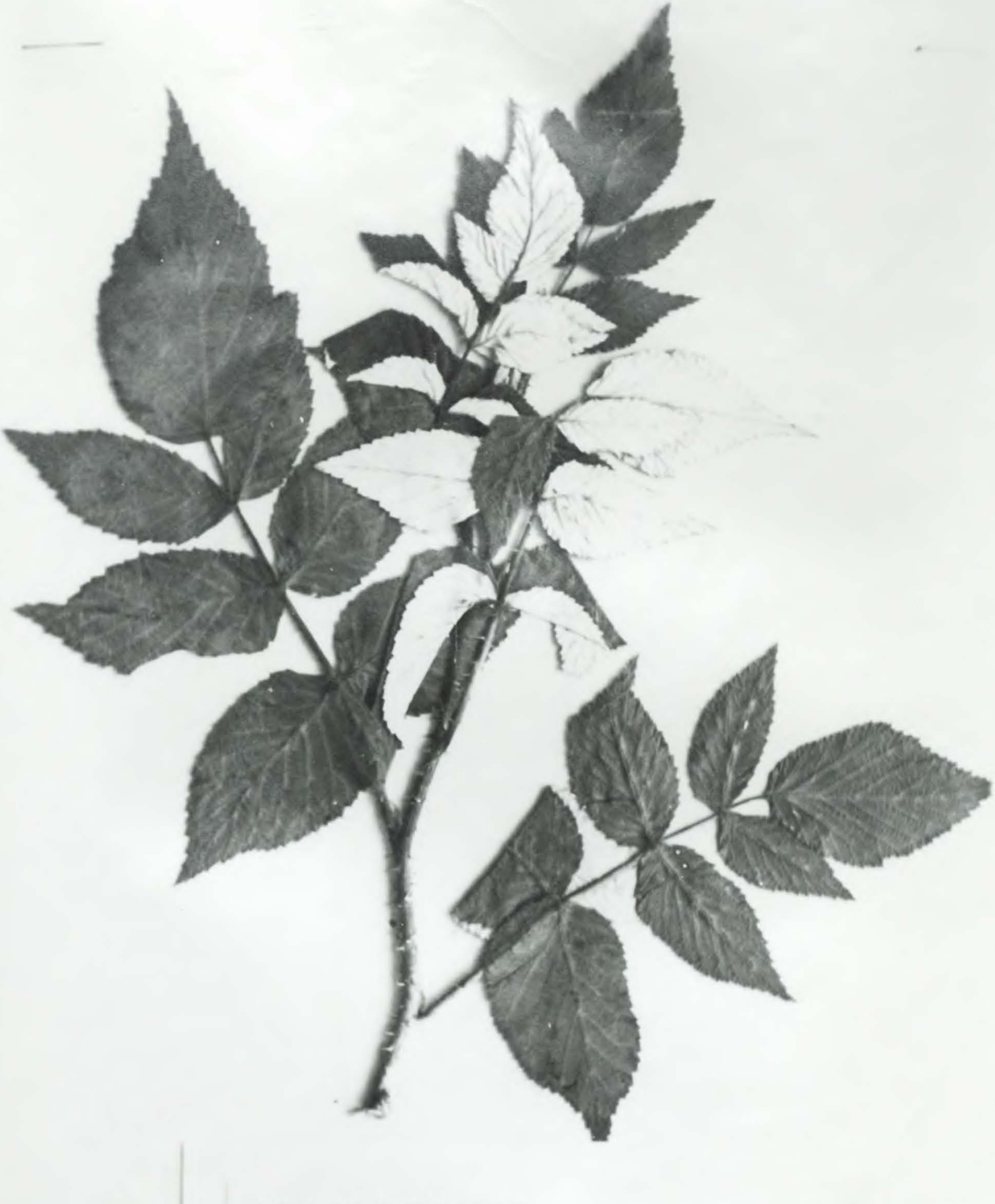
SITE #2 MIDDLE FORK
Buckbrush
(Ceanothus fendleri)



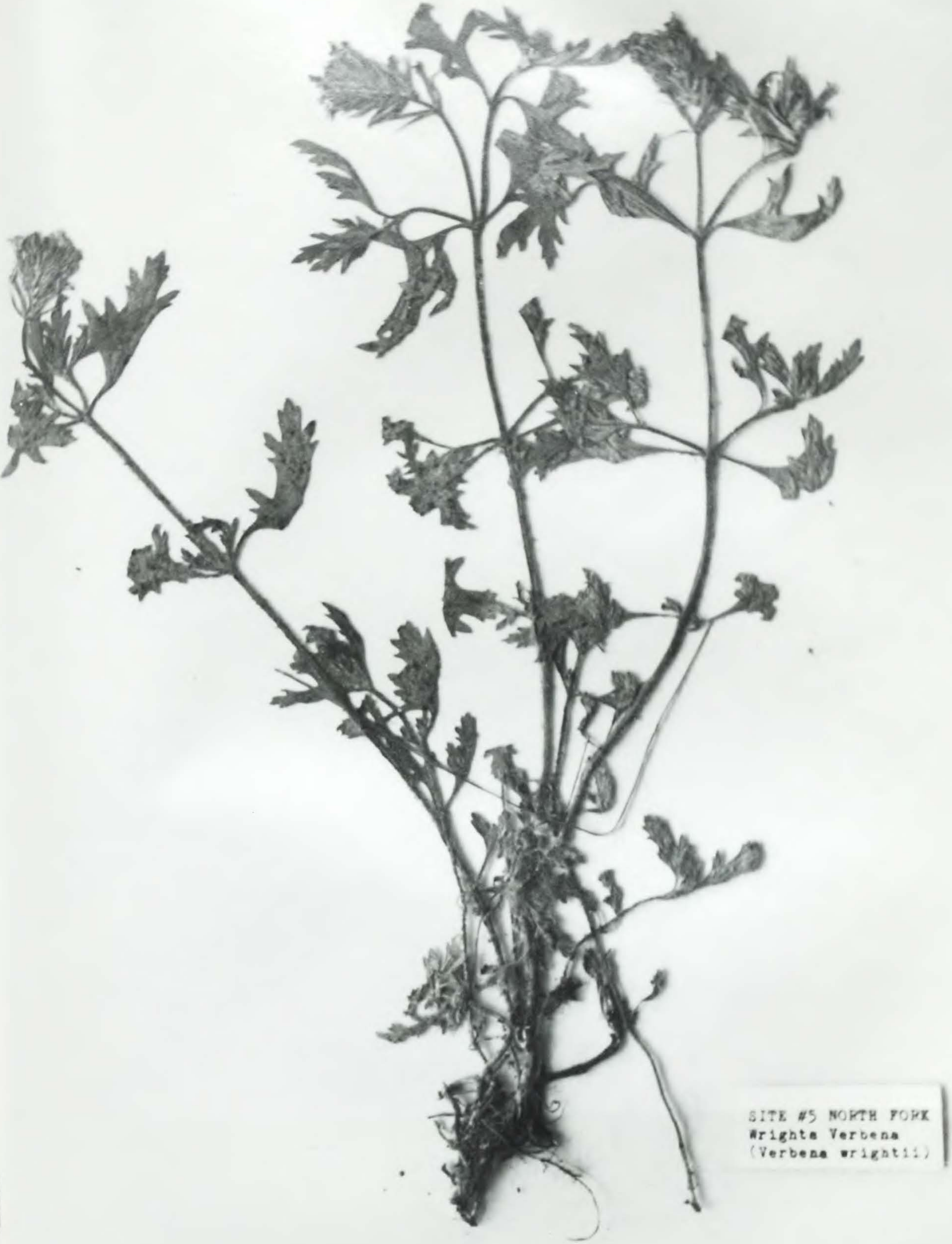
SITE# 5 NORTH FORK
Sideoats Grama
(Bouteloua curtipendula)



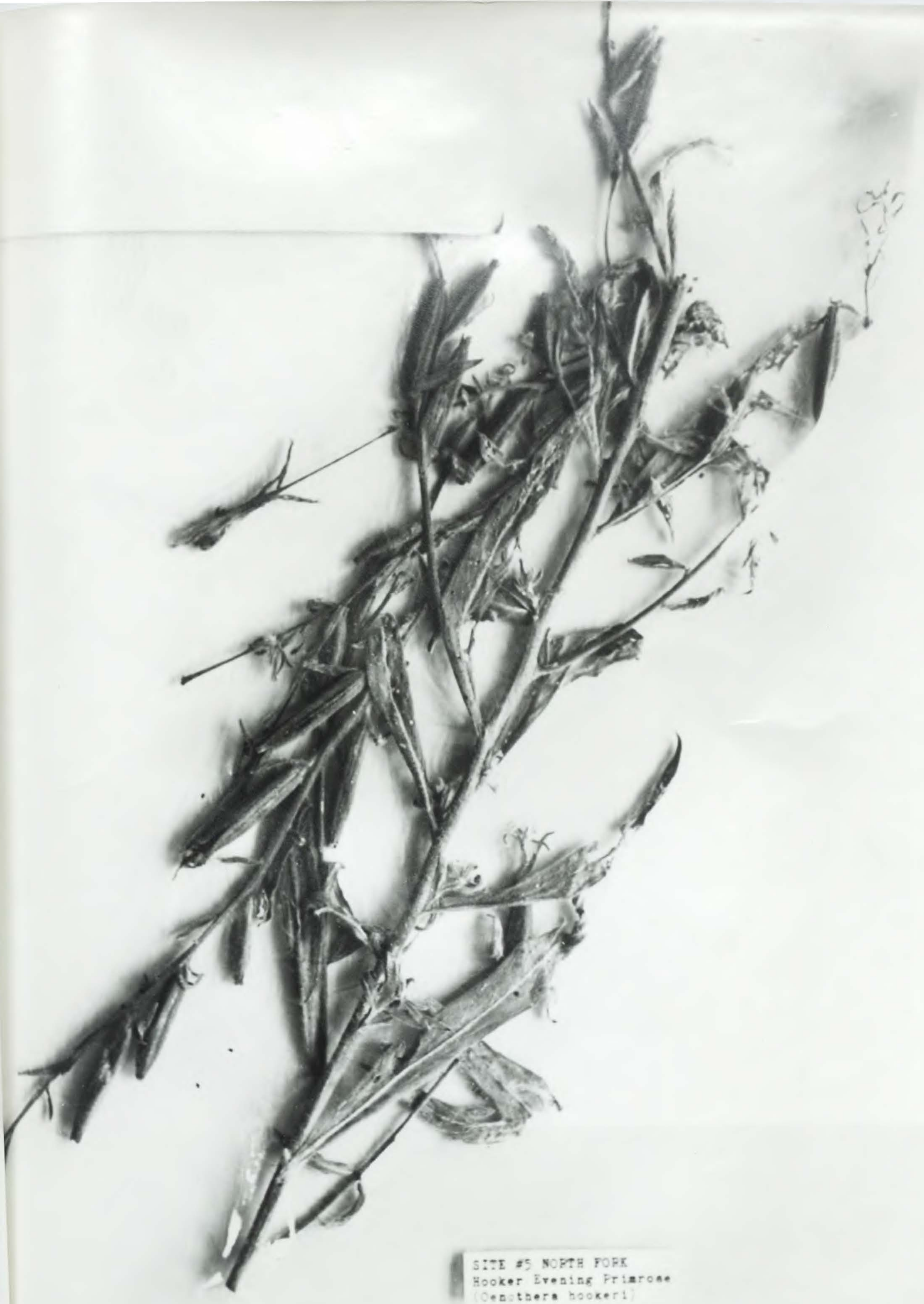
SITE #5 NORTH FORK
Douglas Fir
(Psuedotsuga menziesii)



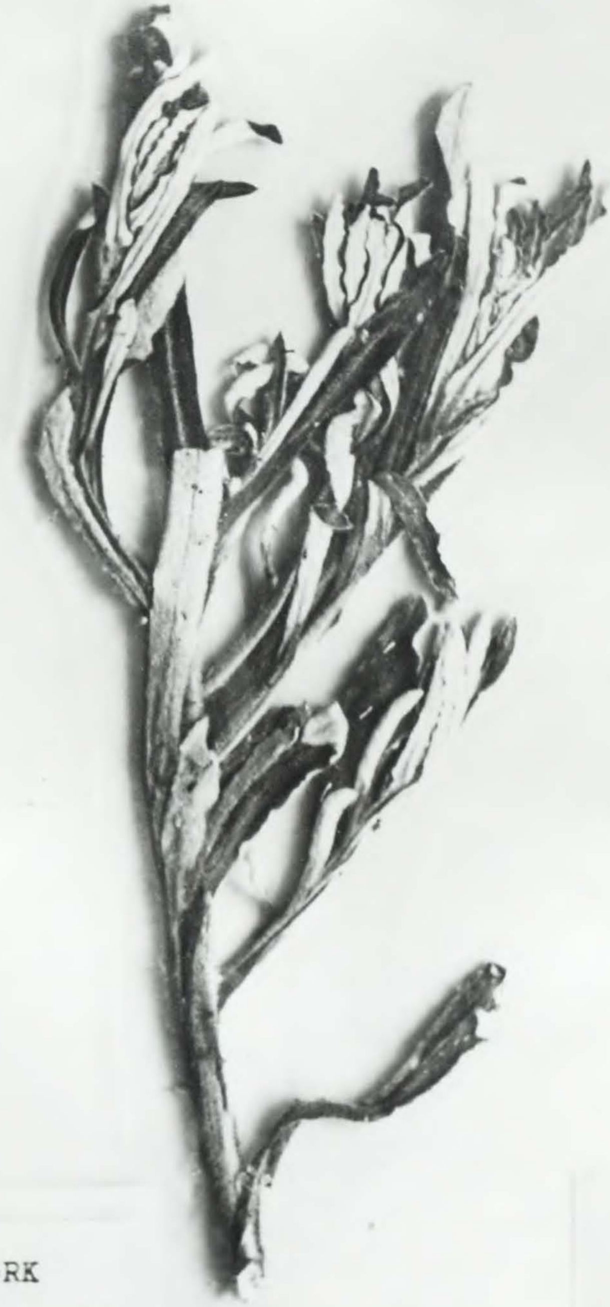
SITE #5 NORTH FORK
Western Red Raspberry
(Rubus strigosus)



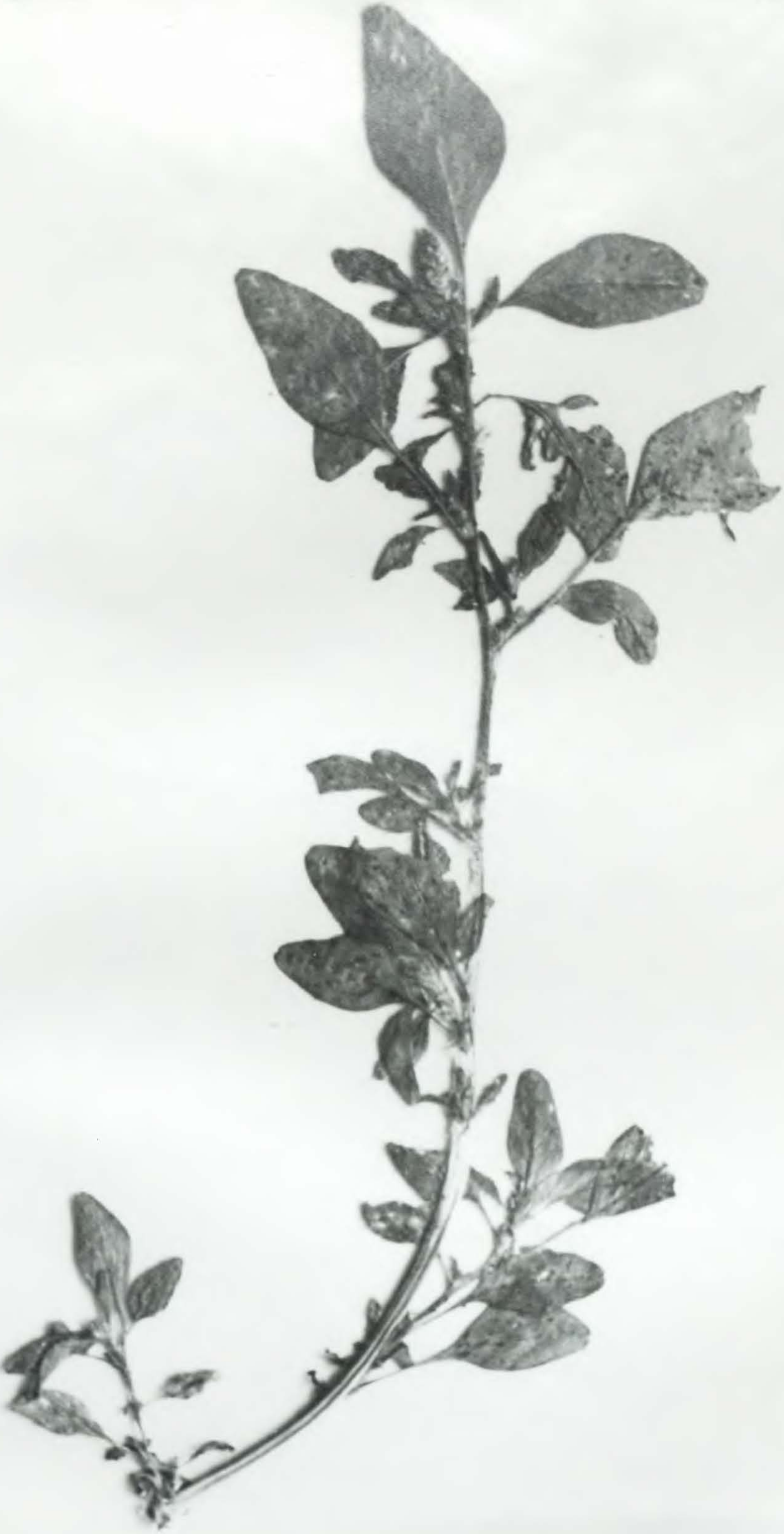
SITE #5 NORTH FORK
Wrights Verbena
(Verbena wrightii)



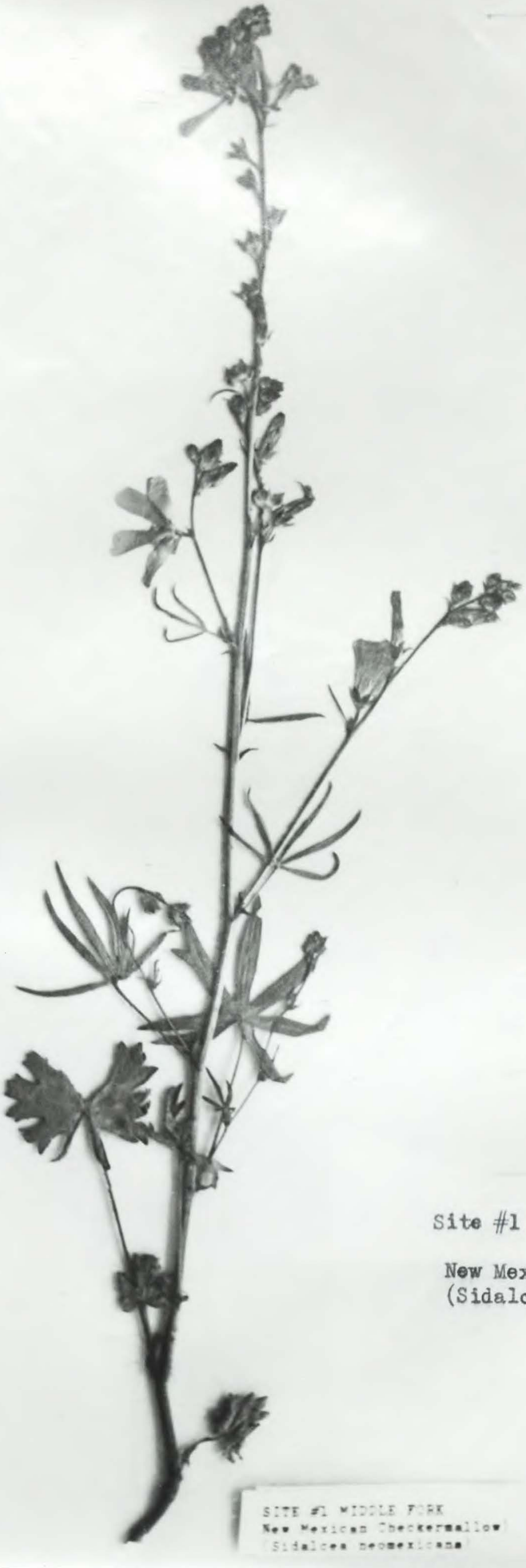
SITE #5 NORTH FORK
Hooker Evening Primrose
(Oenothera hookeri)



SITE #5 NORTH FORK
Cudweed
(Gnaphalium pringlei)

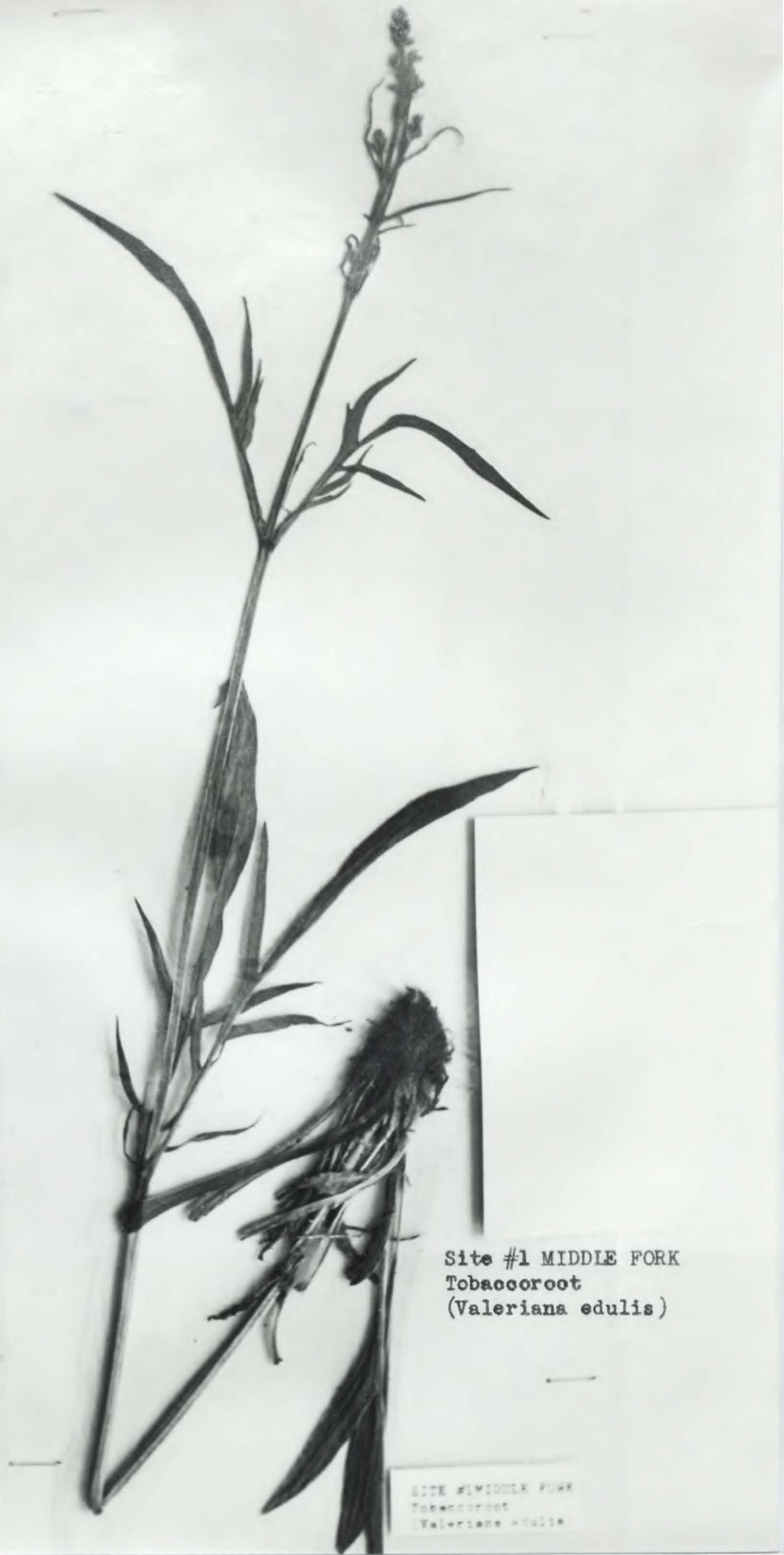


SITE# 5 NORTH FORK
Tumbleweed Amaranth
(Amaranthus graecizans)

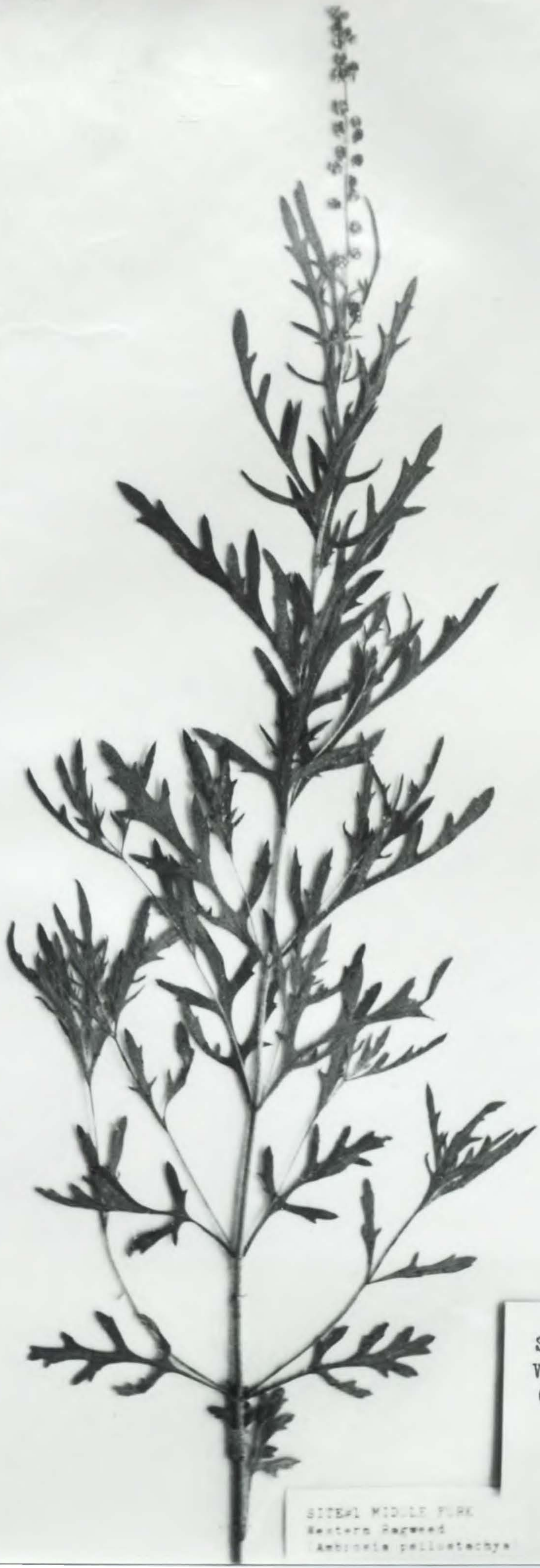

SITE #1 MIDDLE FORK
New Mexican Checkermallow
(Sidalcea neomexicana)

Site #1 MIDDLE FORK

New Mexican Checkermallow
(Sidalcea Neomexicana)

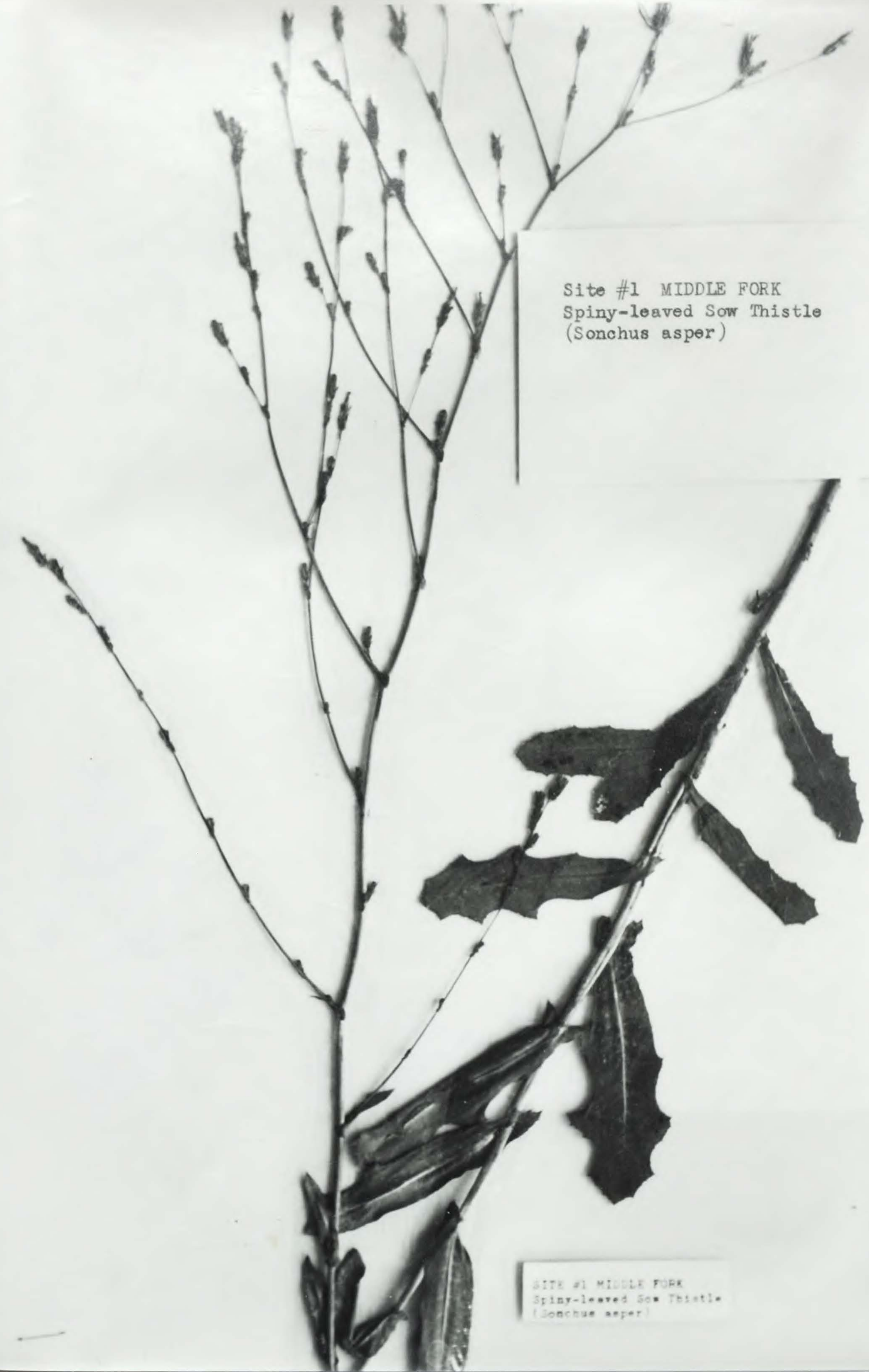

SITE #1 MIDDLE FORK
Tobaccoroot
(Valeriana edulis)

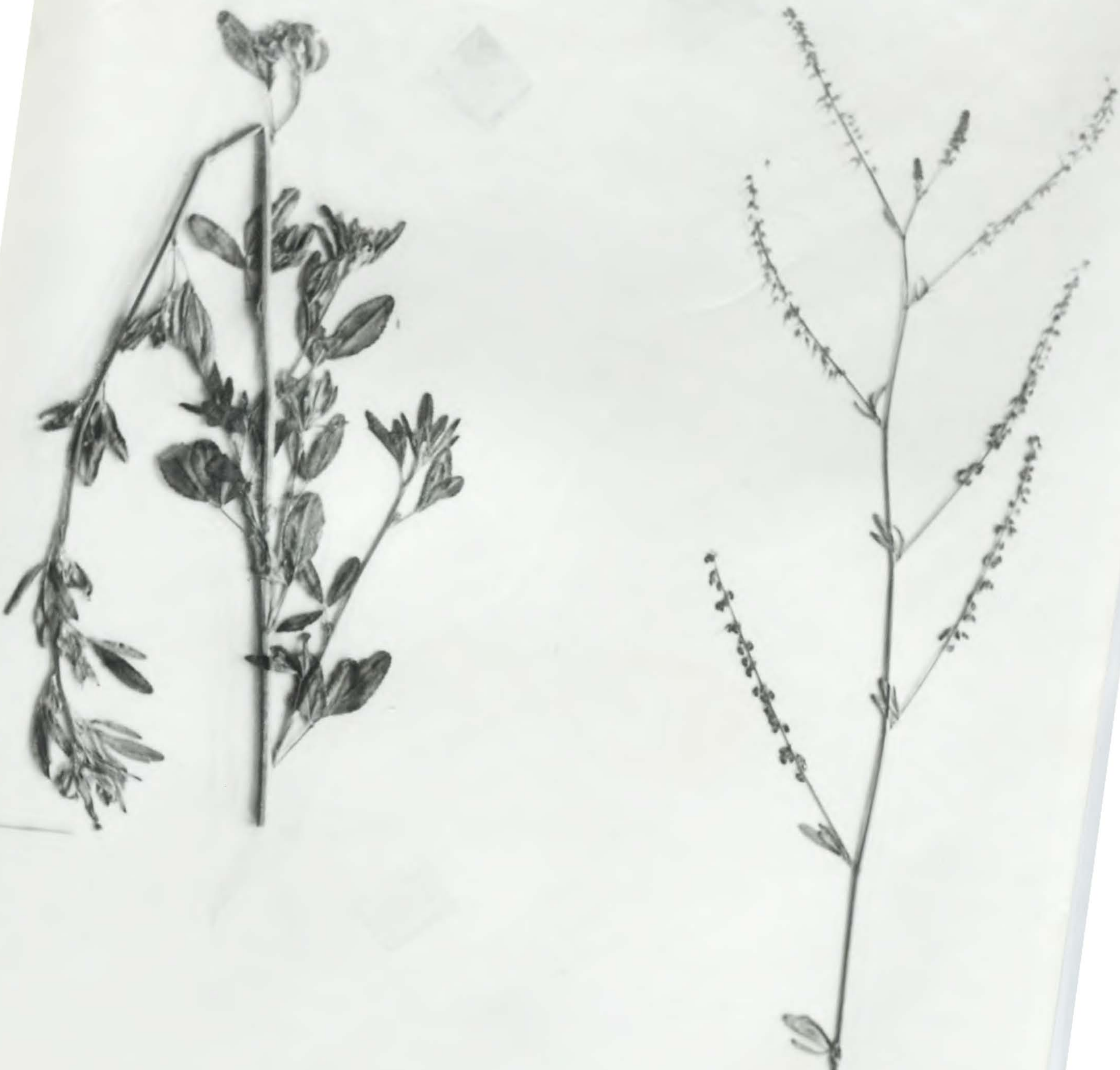
Site #1 MIDDLE FORK
Tobaccoroot
(Valeriana edulis)


SITE#1 MIDDLE FORK
Western Ragweed
(Ambrosia psilostachya

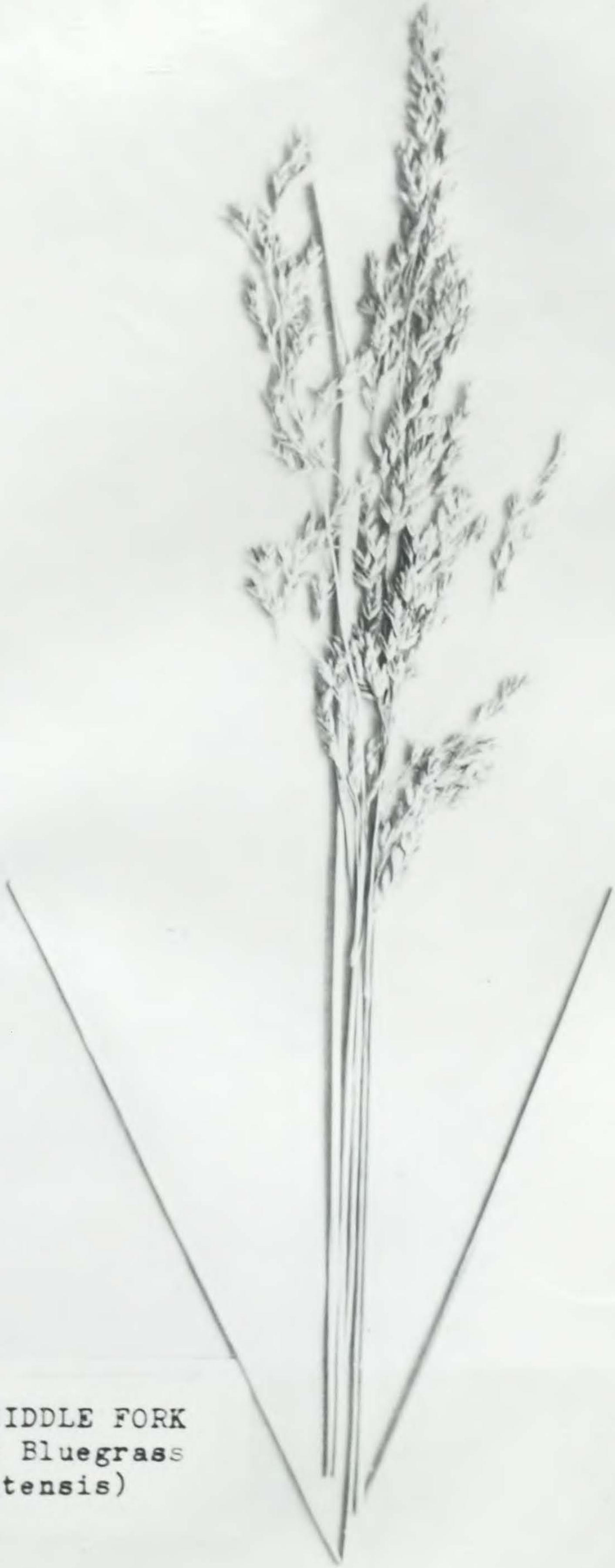
Site #1 MIDDLE FORK
Western Ragweed
(Ambrosia psilostachya)

Site #1 MIDDLE FORK
Spiny-leaved Sow Thistle
(Sonchus asper)

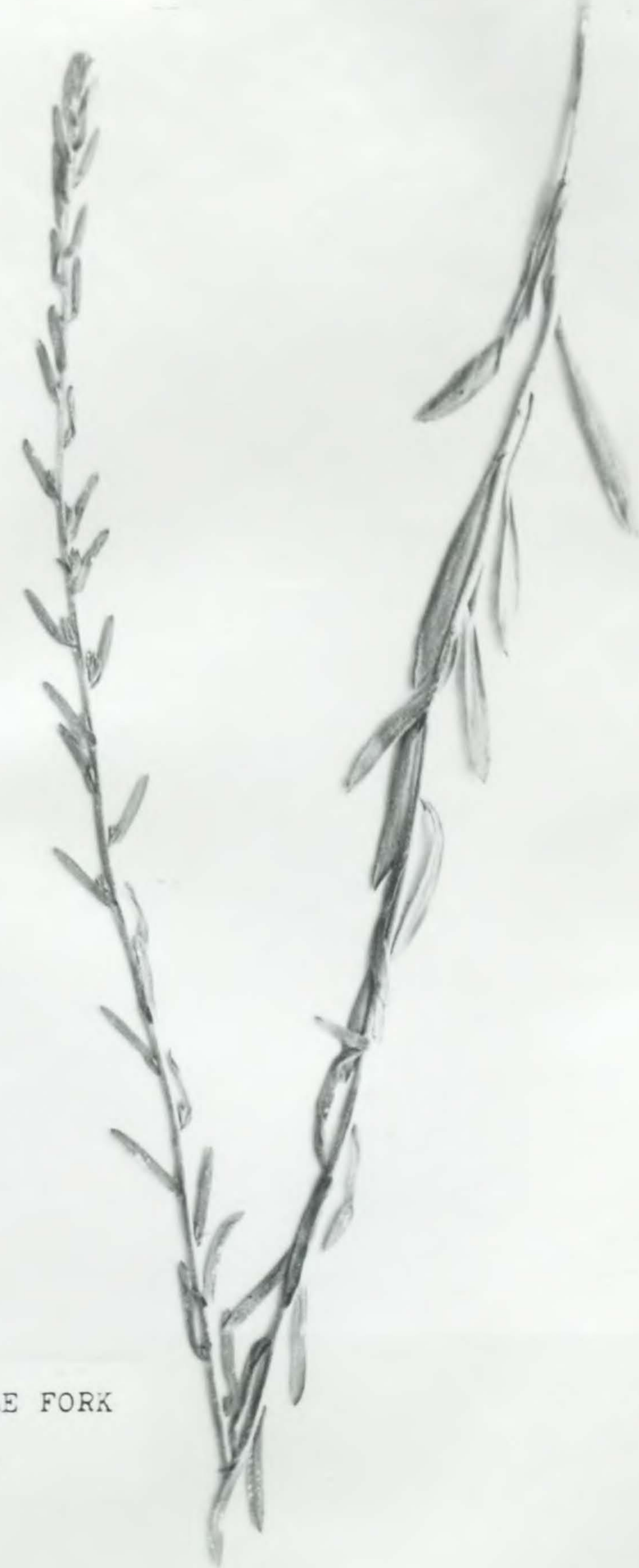

SITE #1 MIDDLE FORK
Spiny-leaved Sow Thistle
(Sonchus asper)



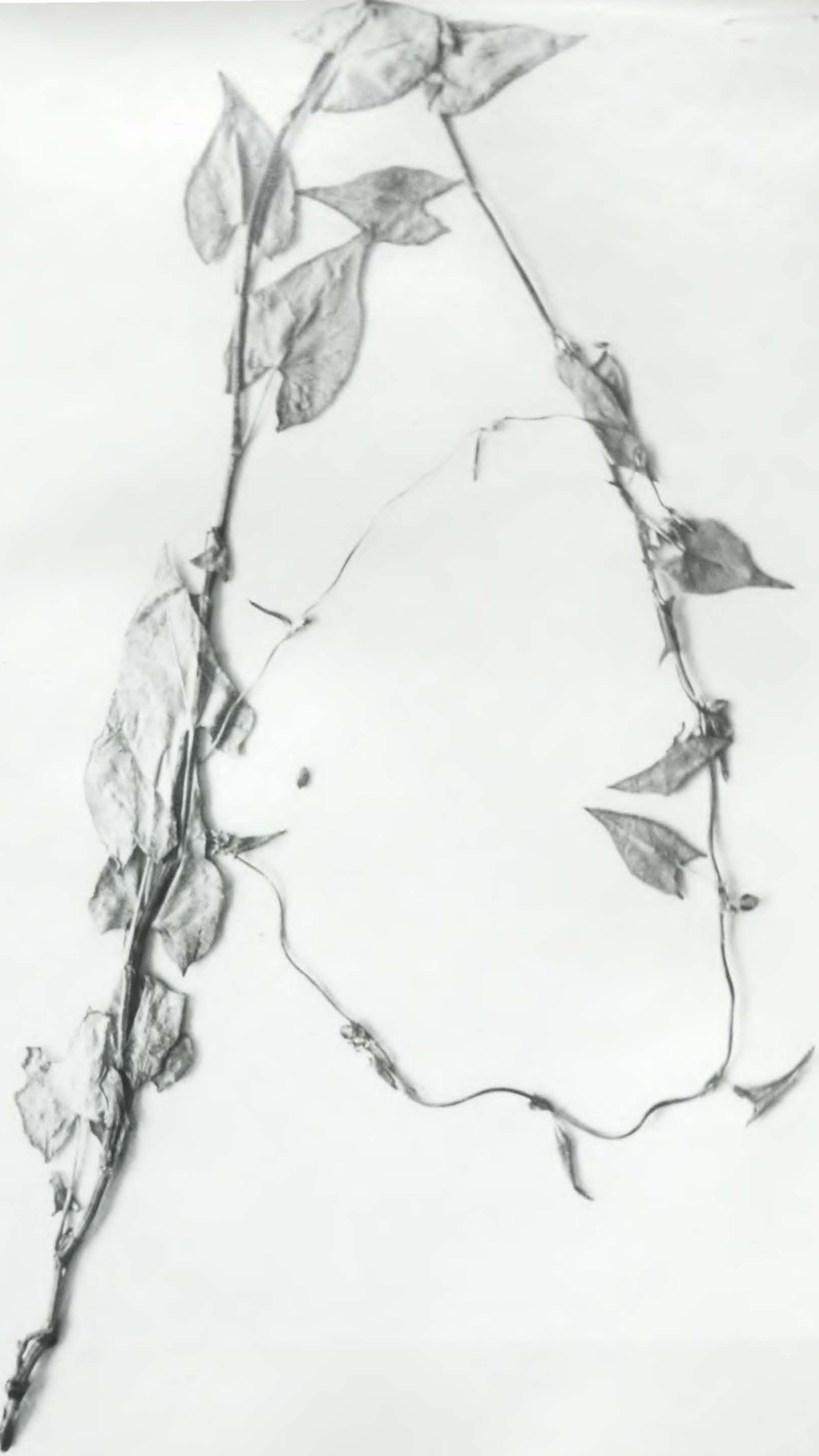
SITE #1 MIDDLE FORK
White Sweetclover
(Melilotus albus)



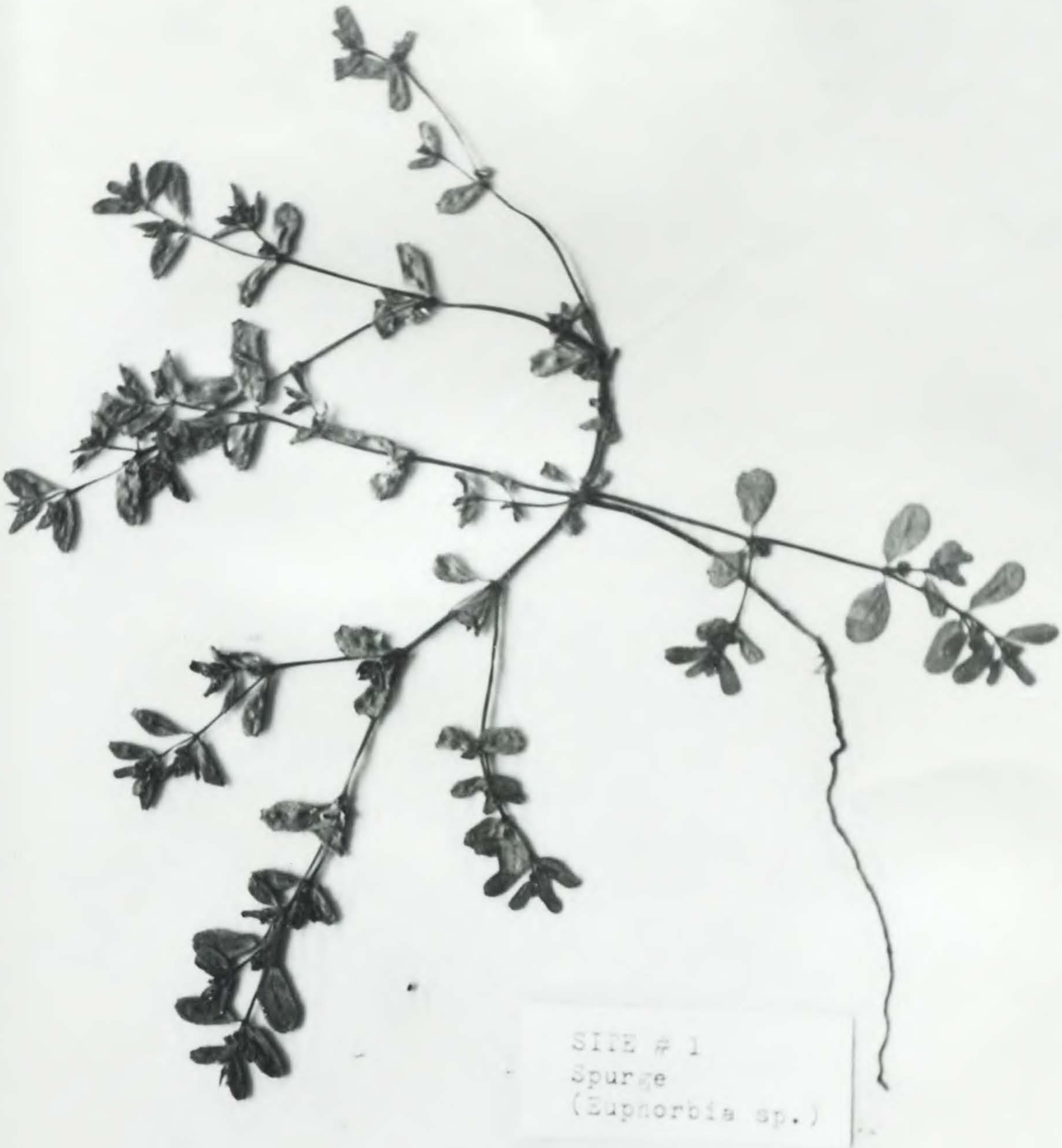
SITE #1MIDDLE FORK
Kentucky Bluegrass
(Poa pratensis)



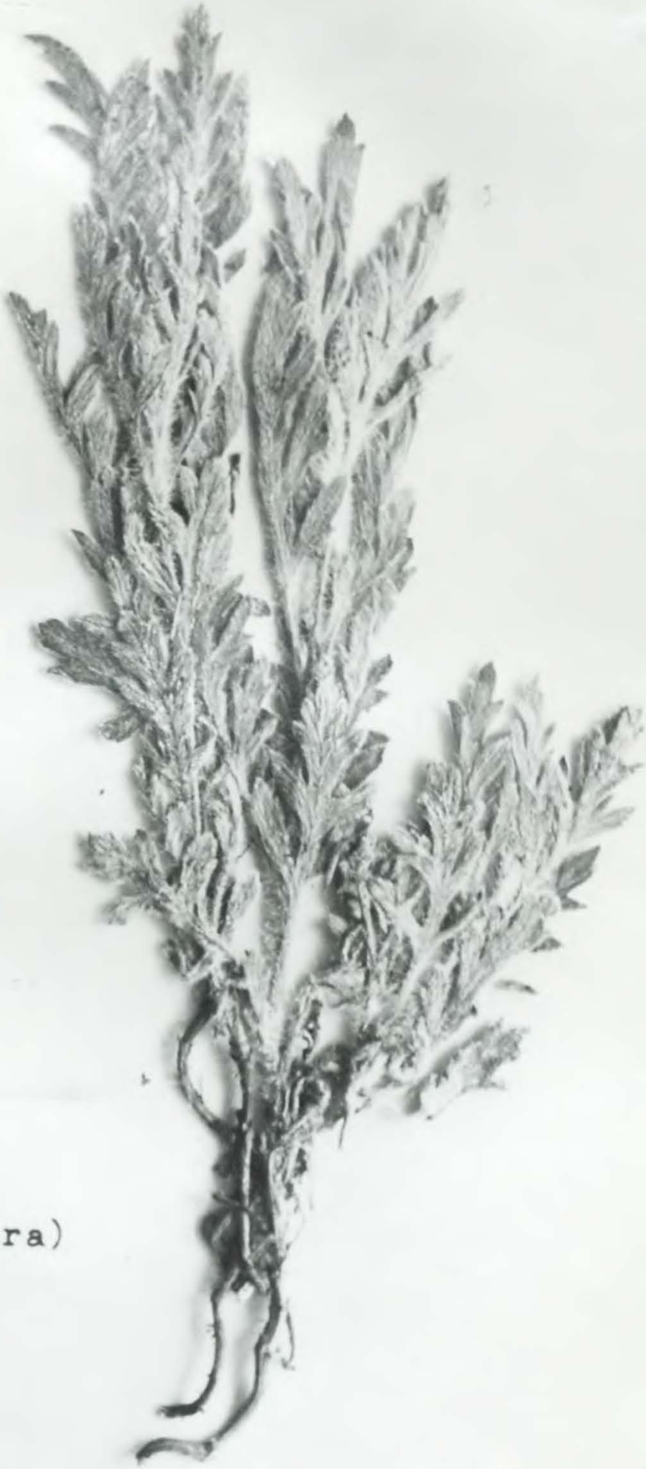
SITE #1 MIDDLE FORK
Loosestrife
(Lythrum sp.)



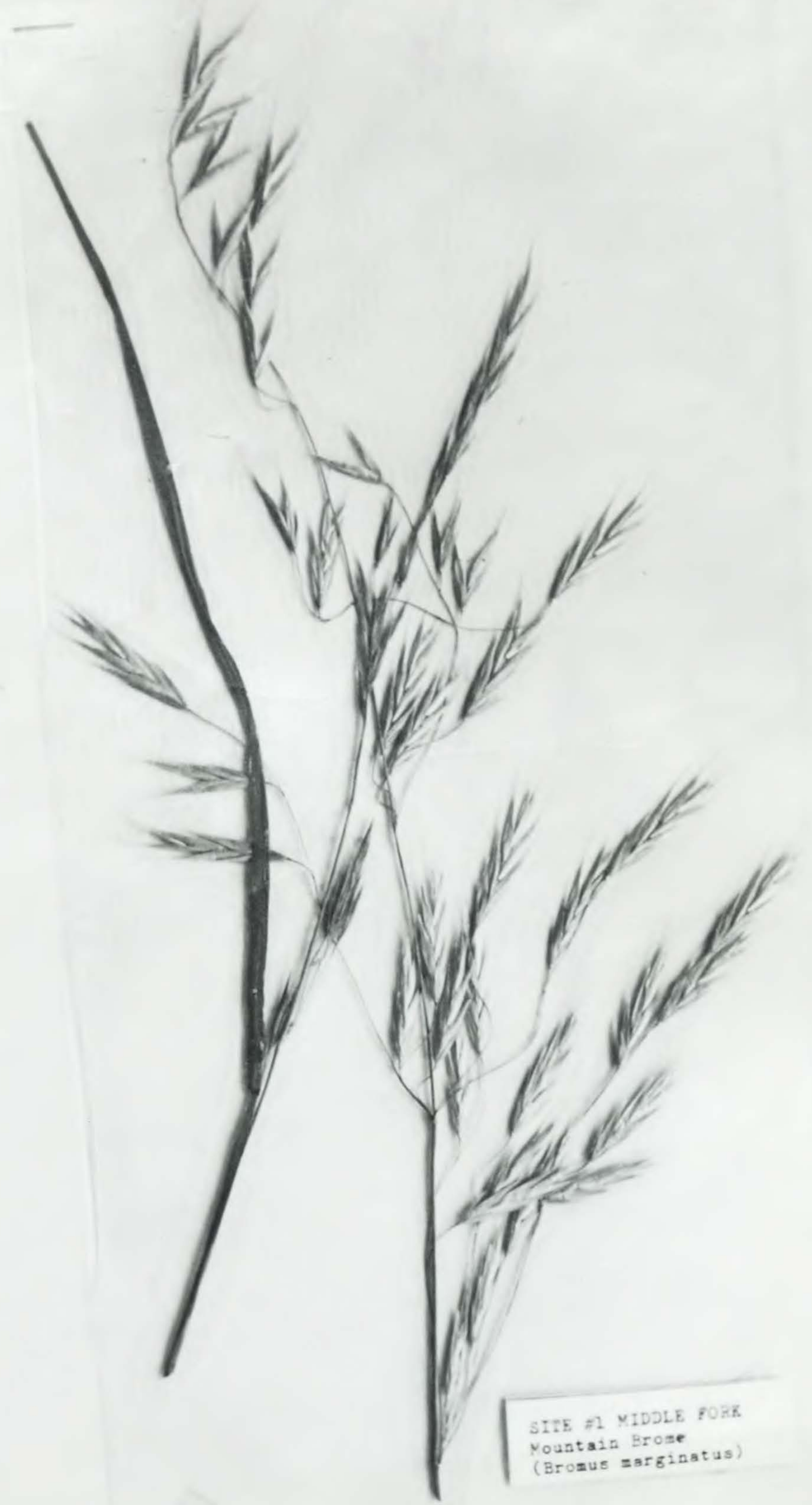
SITE #1 MIDDLE FORK
Dullseed Cornbind
(Polygonum convolvulus)

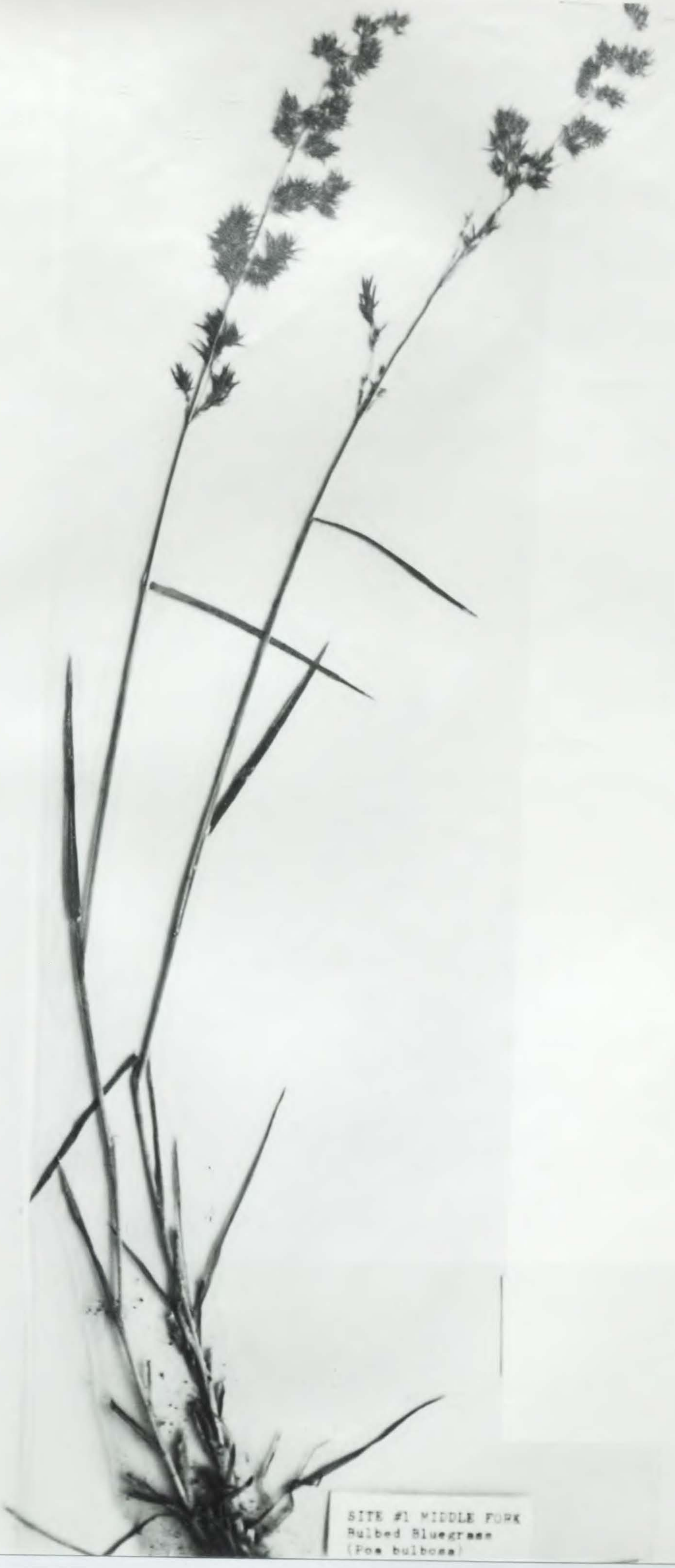


SITE # 1
Spurge
(Euphorbia sp.)

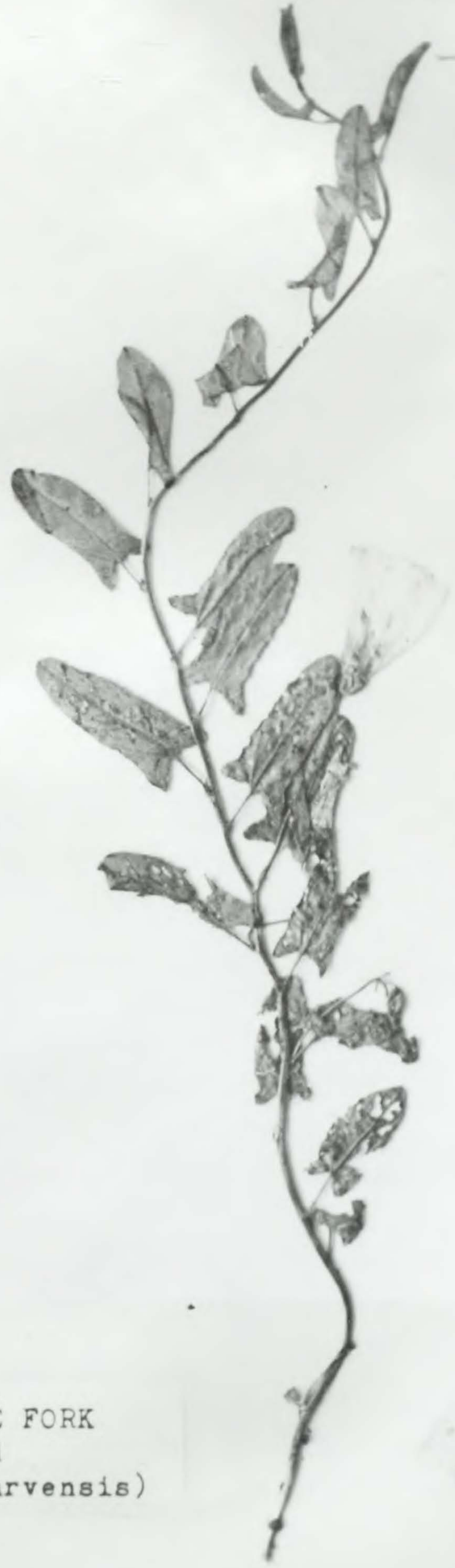


SITE #1 MIDDLE FORK
Bur-sage
(Franseria confertiflora)

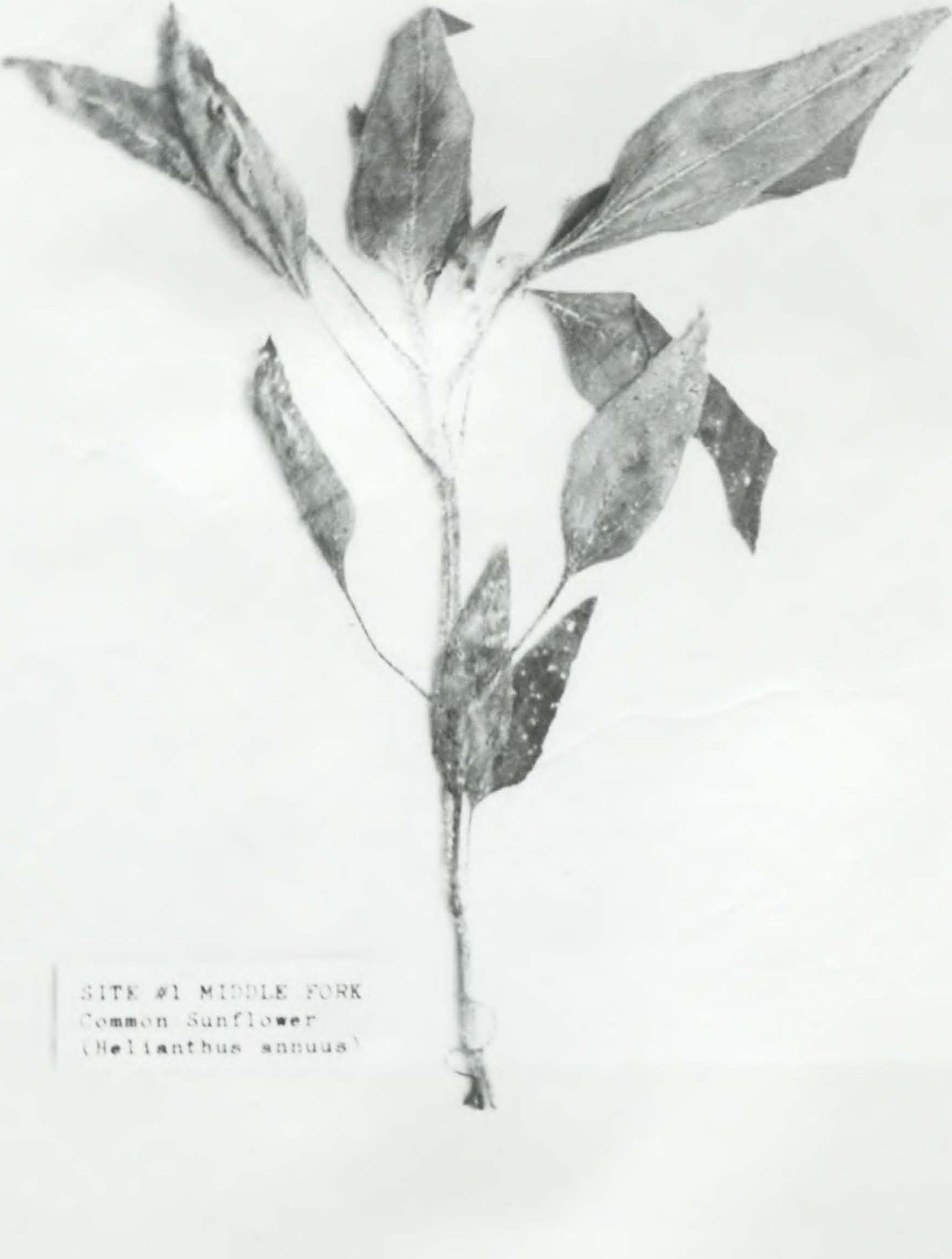

SITE #1 MIDDLE FORK
Mountain Brome
(Bromus marginatus)



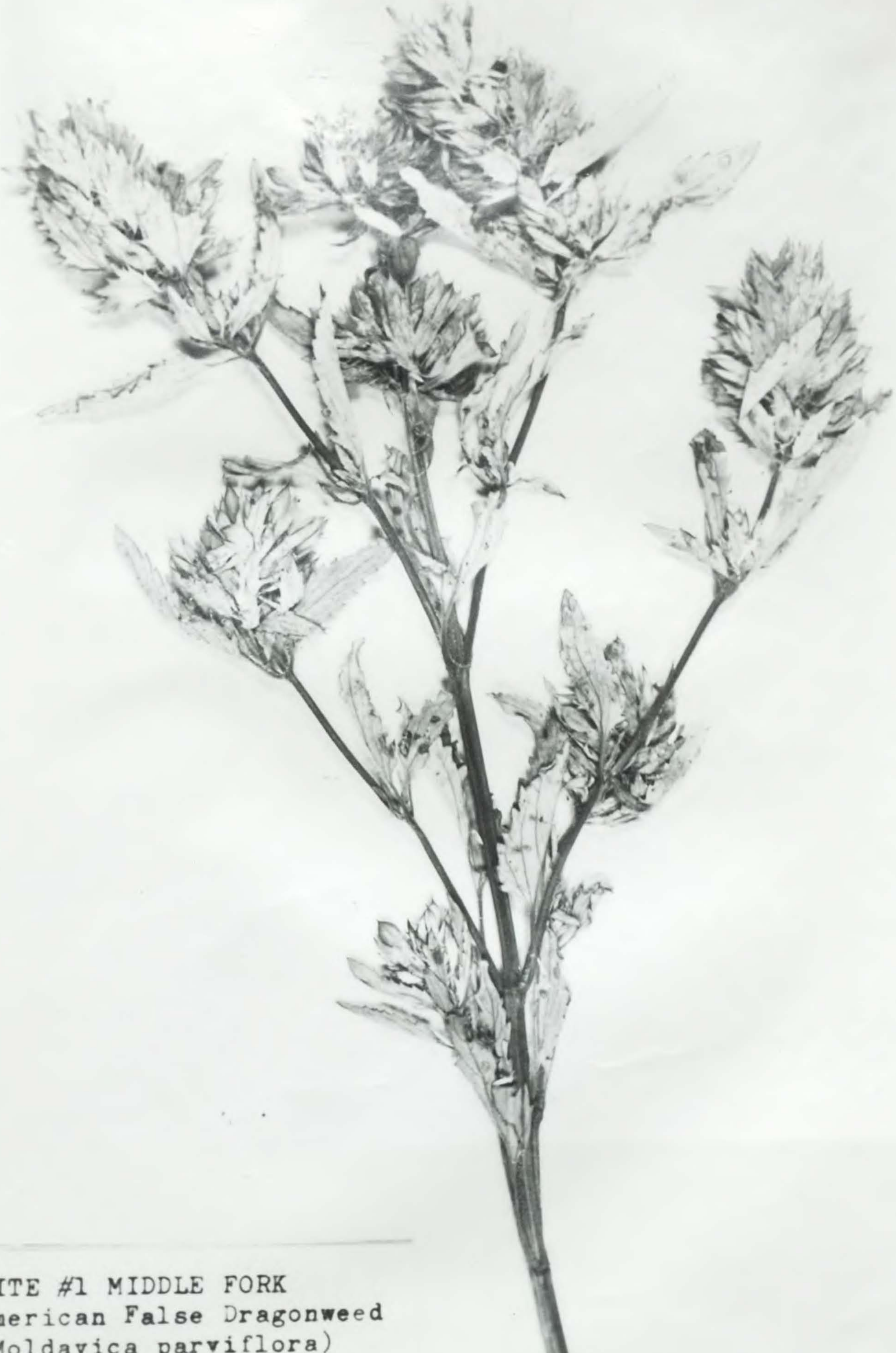
SITE #1 MIDDLE FORK
Bulbed Bluegrass
(Poa bulbosa)



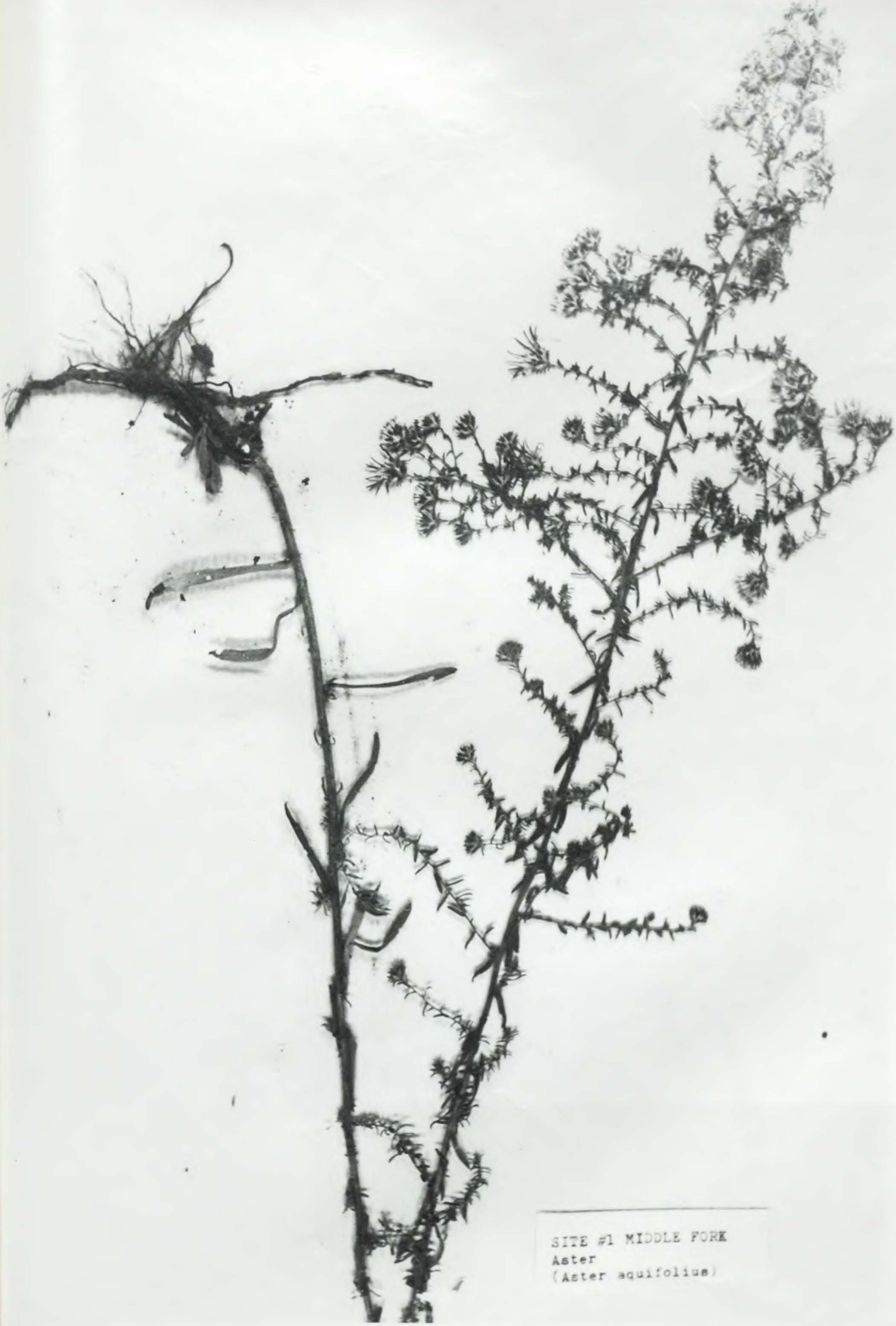
SITE #1 MIDDLE FORK
Field Bindweed
(Convolvulus arvensis)



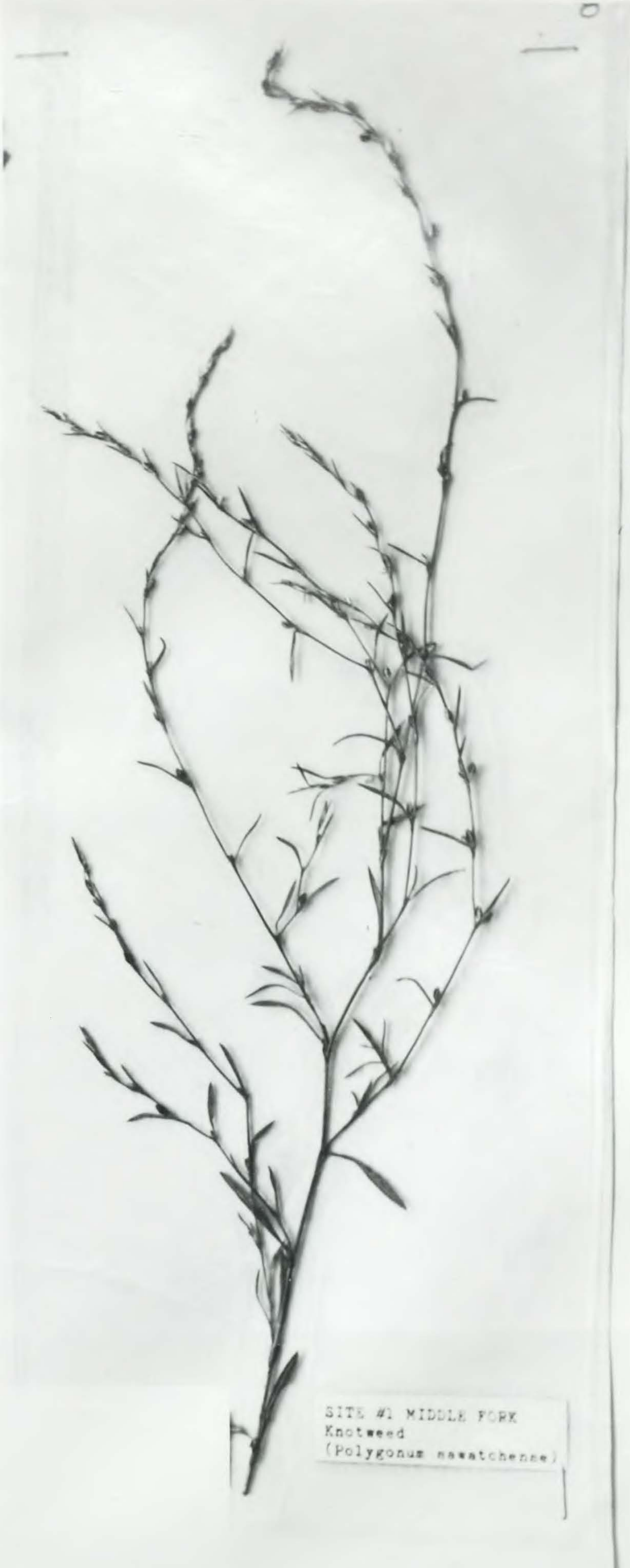
SITE #1 MIDDLE FORK
Common Sunflower
(Helianthus annuus)



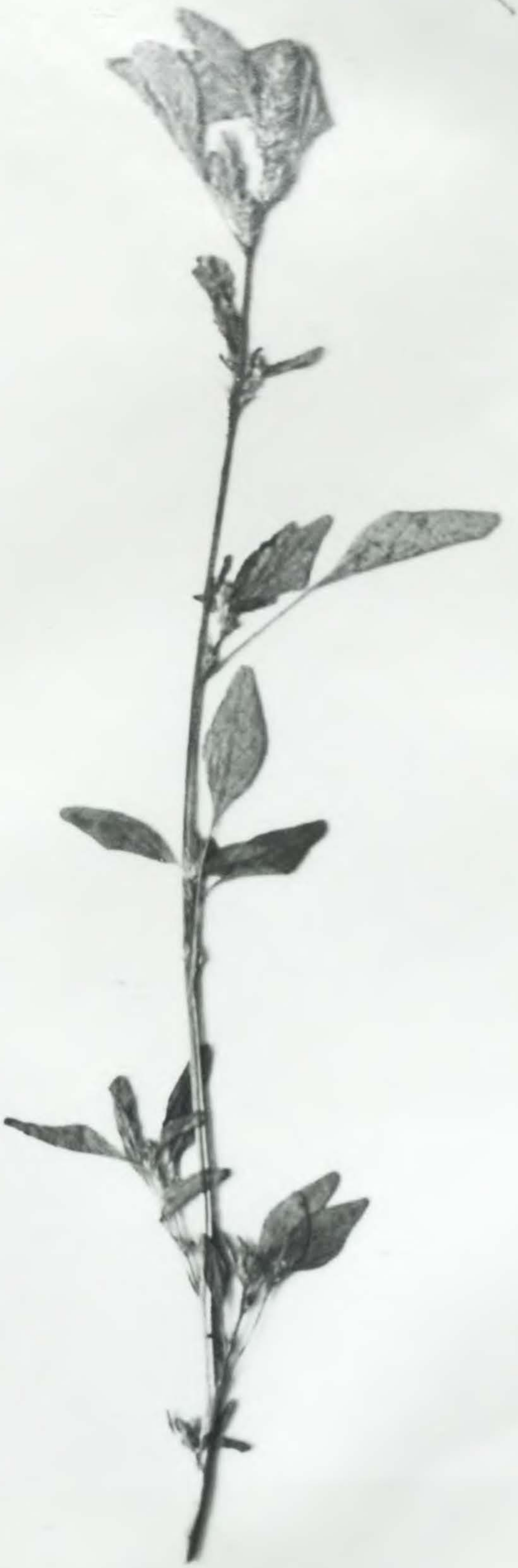
SITE #1 MIDDLE FORK
American False Dragonweed
(Moldavica parviflora)



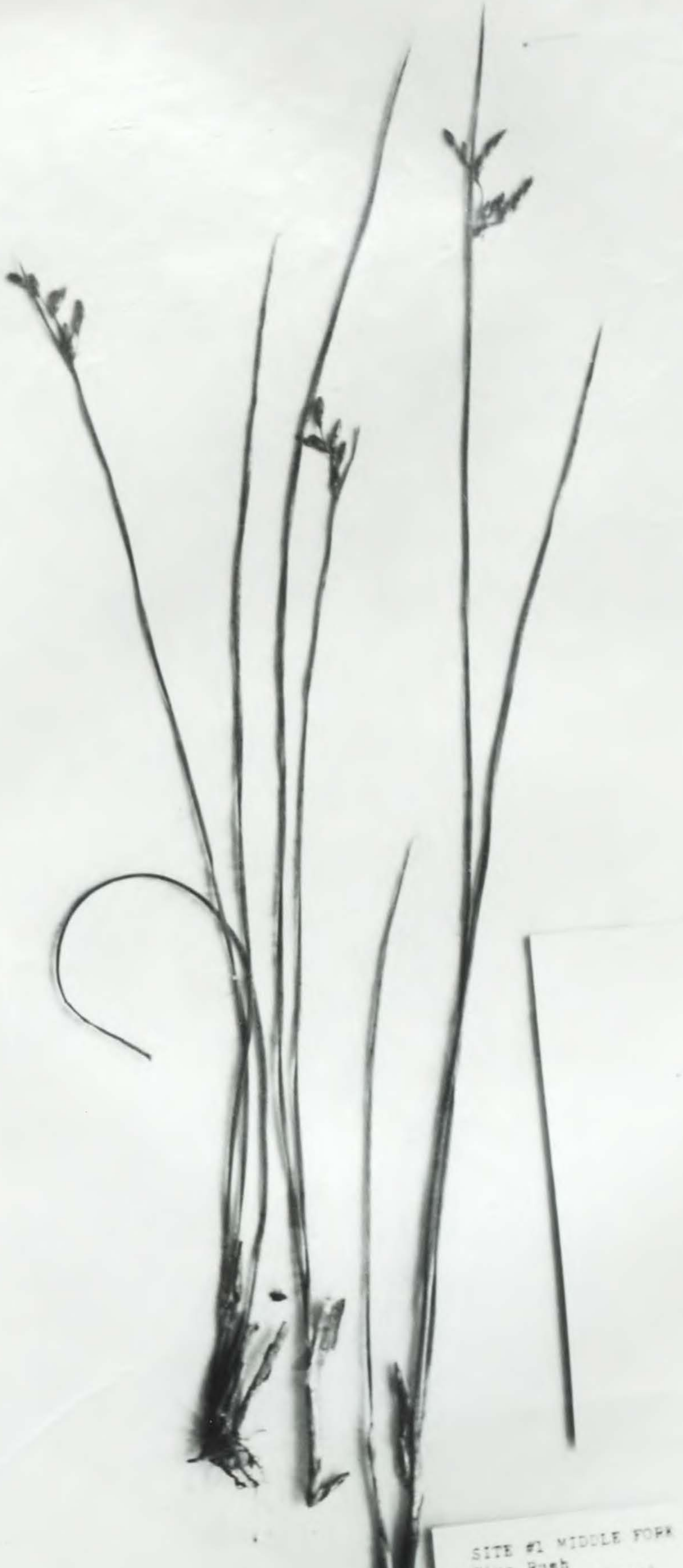
SITE #1 MIDDLE FORK
Aster
(Aster aquifolius)

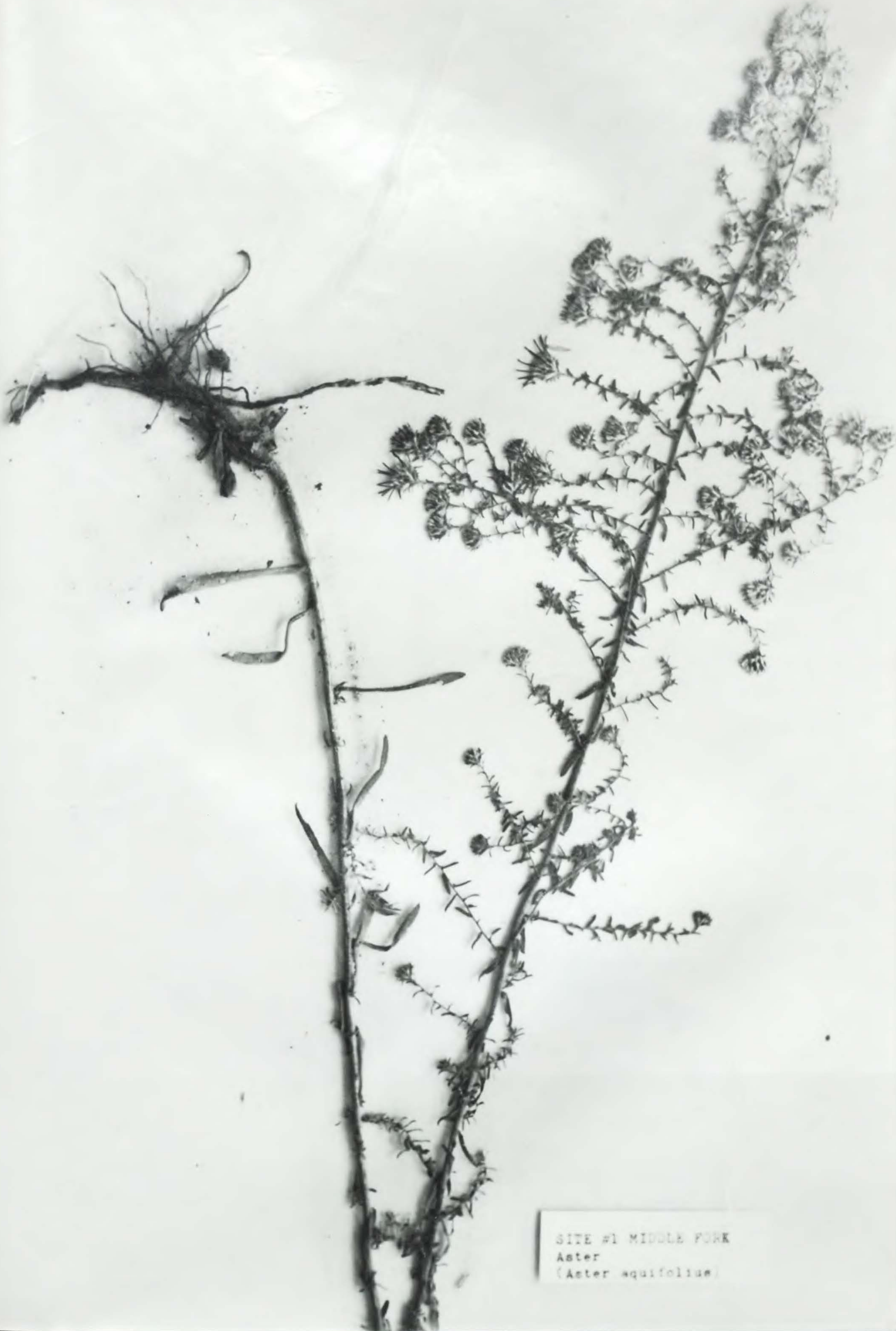


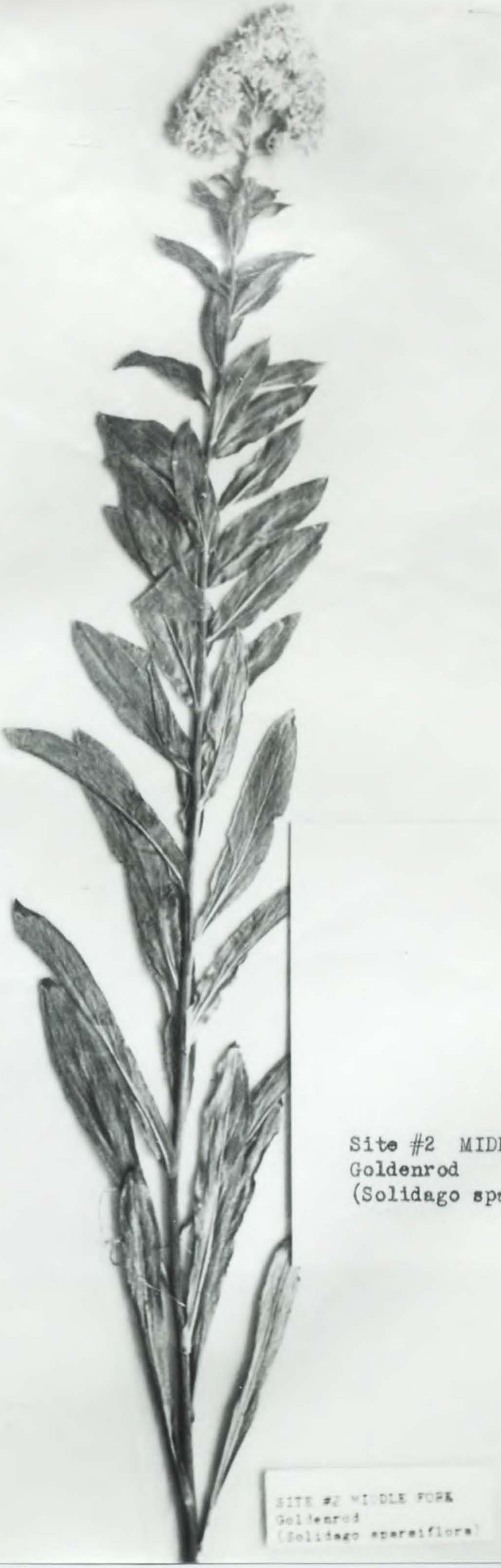
SITE #1 MIDDLE FORK
Knotweed
(Polygonum sawatchense)



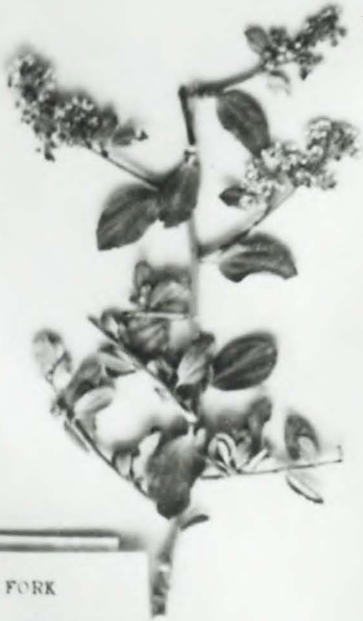
SITE #1 MIDDLE FORK
Tumbleweed Amaranth
(Amaranthus graecizans)


SITE #1 MIDDLE FORK
Wire Rush
(Juncus balticus)

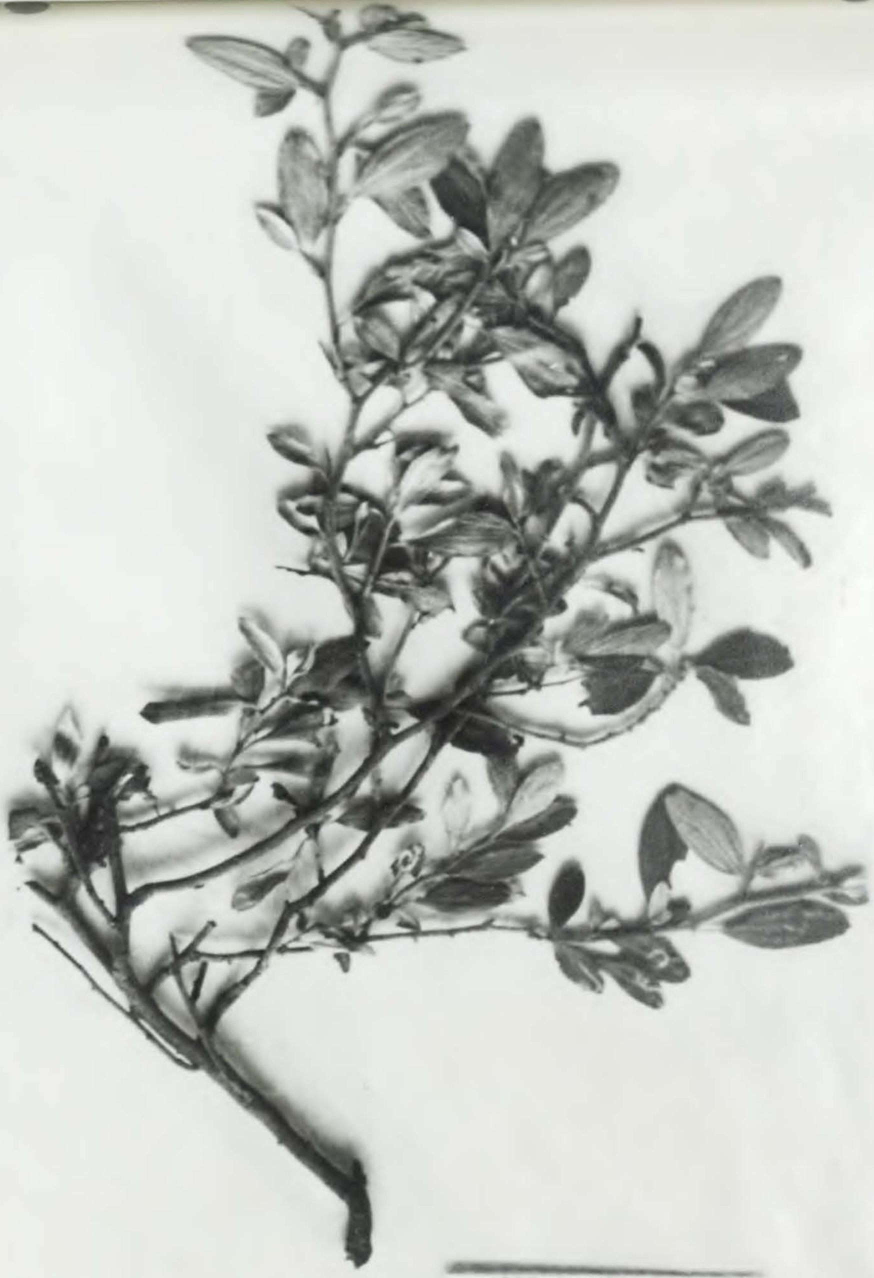

SITE #1 MIDDLE FORK
Aster
(Aster aquifolius)


SITE #2 MIDDLE FORK
Goldenrod
(Solidago sparsiflora)

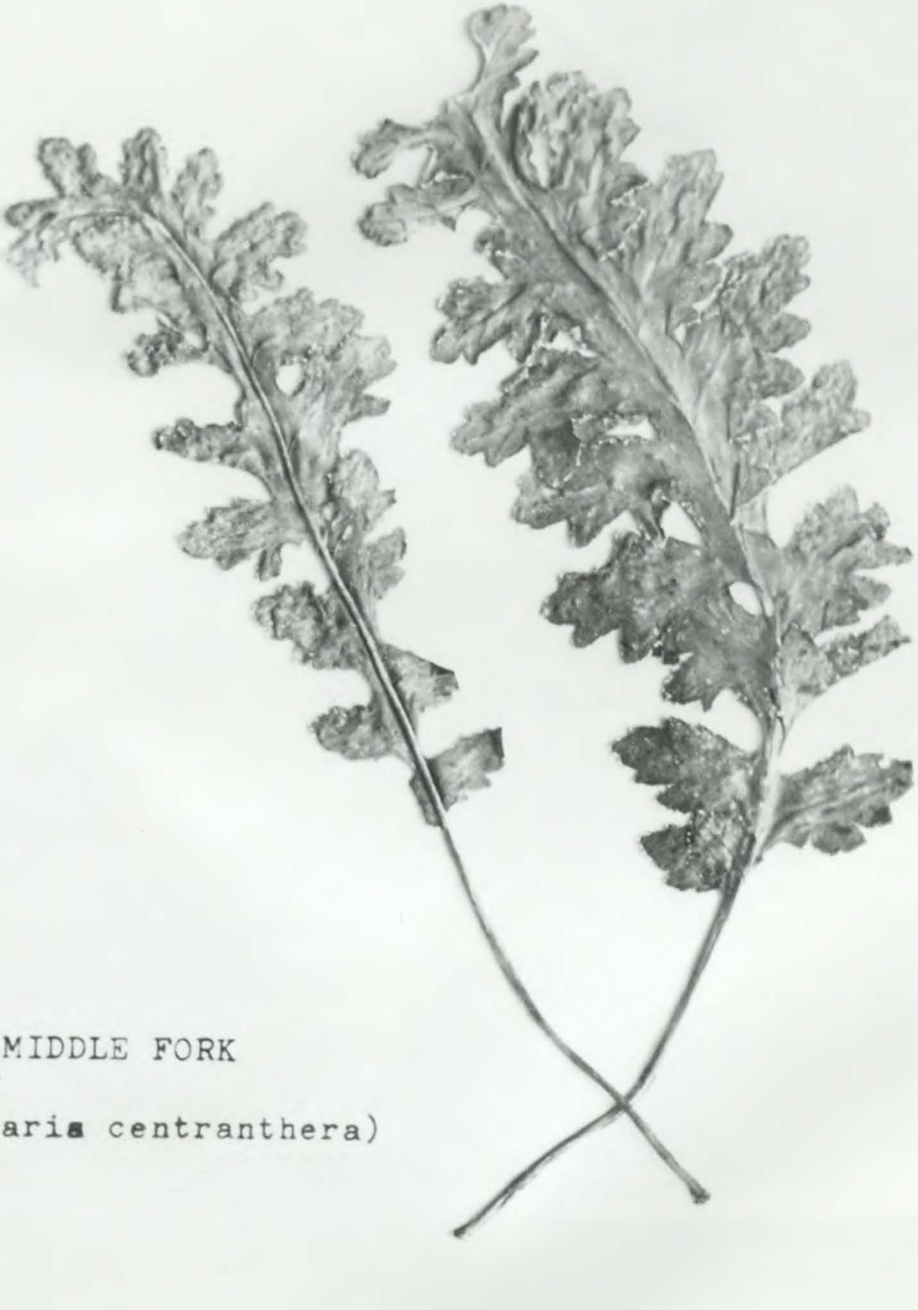
Site #2 MIDDLE FORK
Goldenrod
(Solidago sparsiflora)



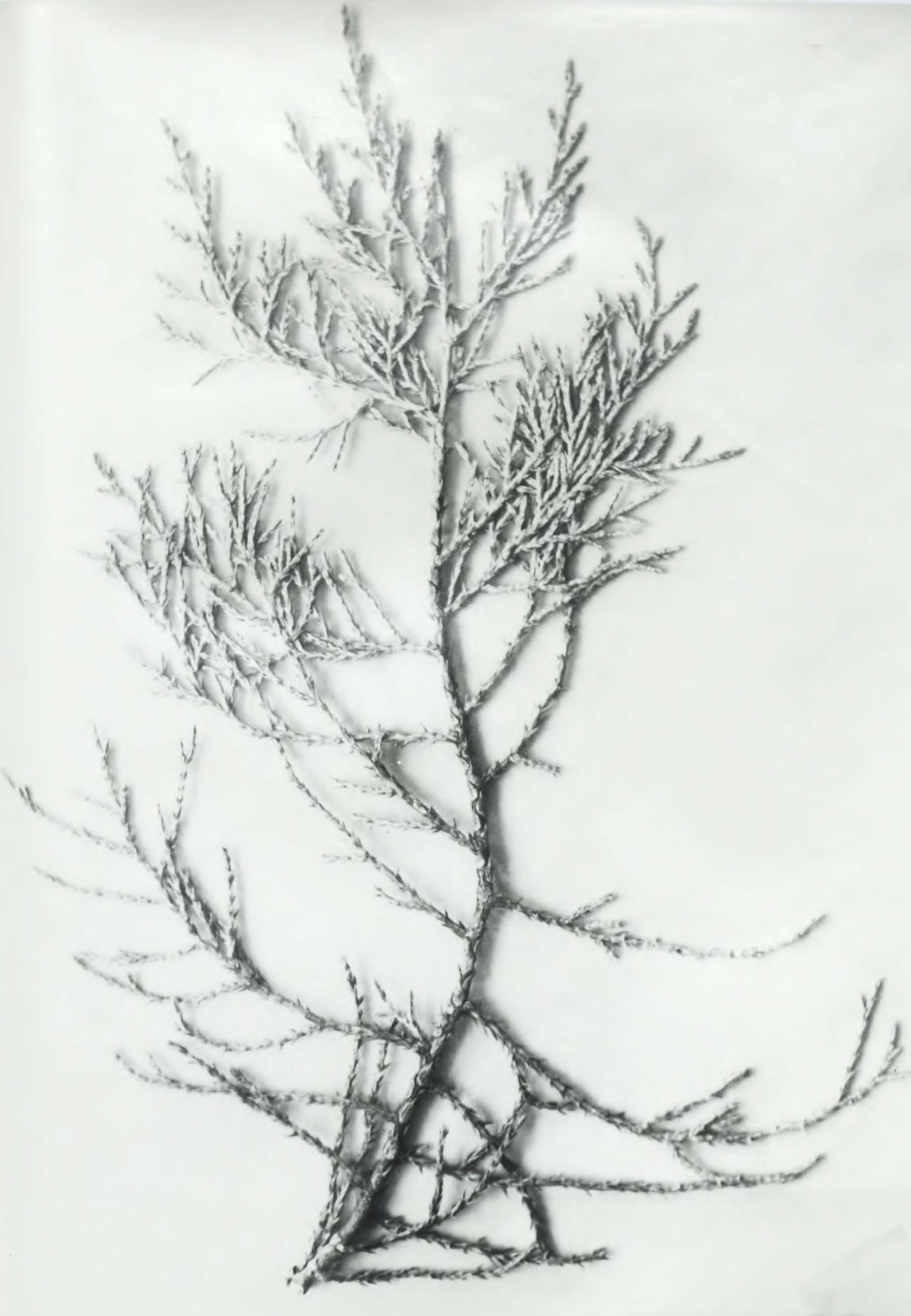
SITE #5 NORTH FORK
Buckbrush
(Ceanothus fendleri)



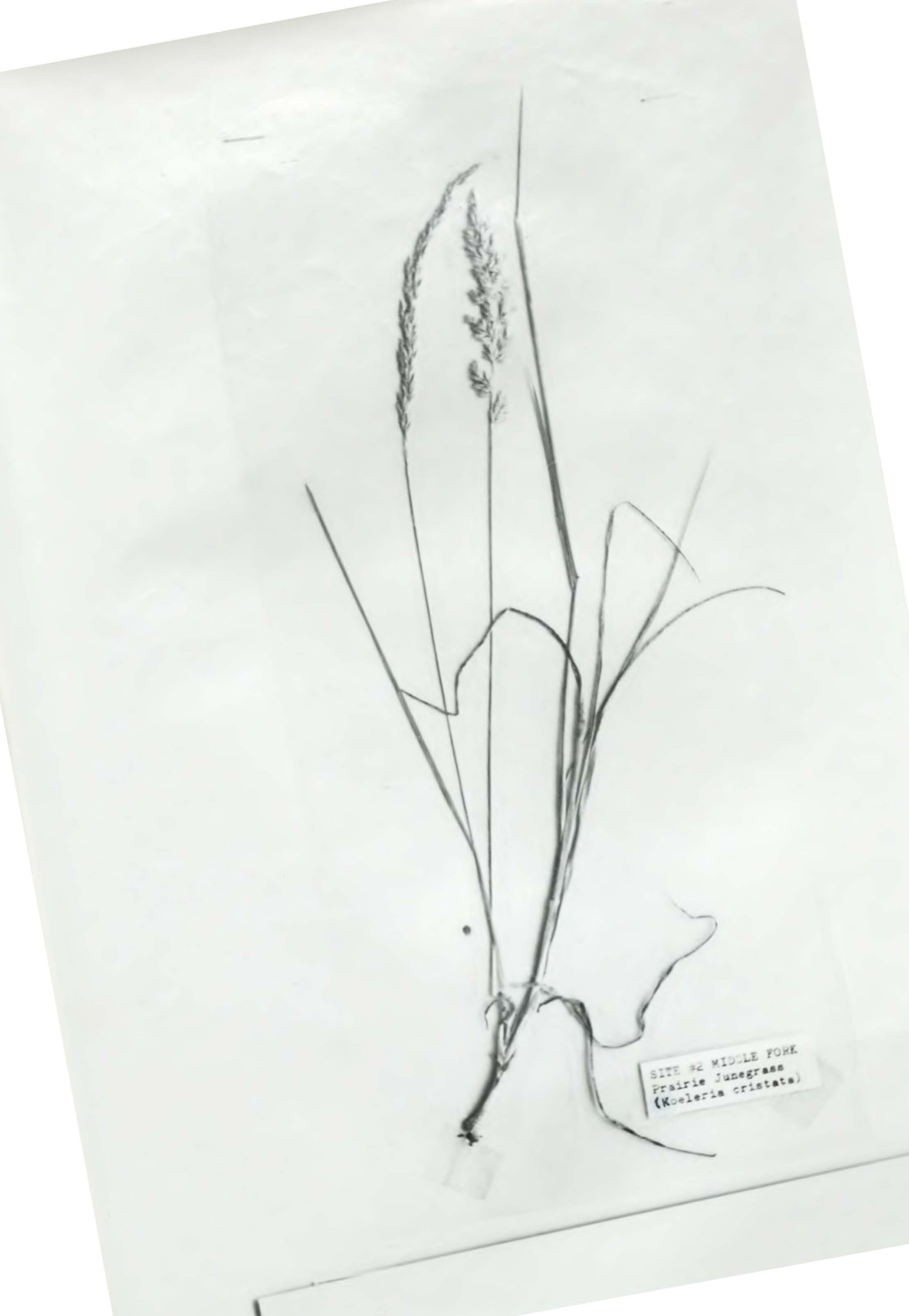
SITE #2 MIDDLE FORK
Buckbrush
(Ceanothus fendleri)

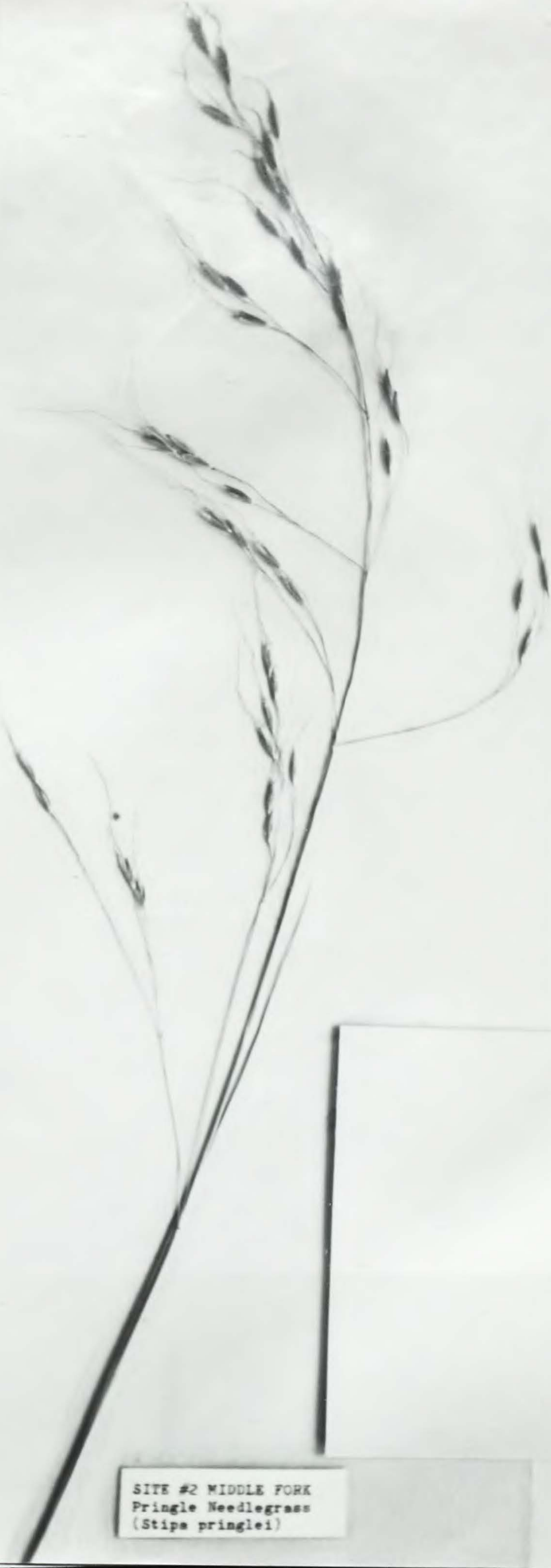


SITE #2 MIDDLE FORK
Fernleaf
(Pedicularis centranthera)

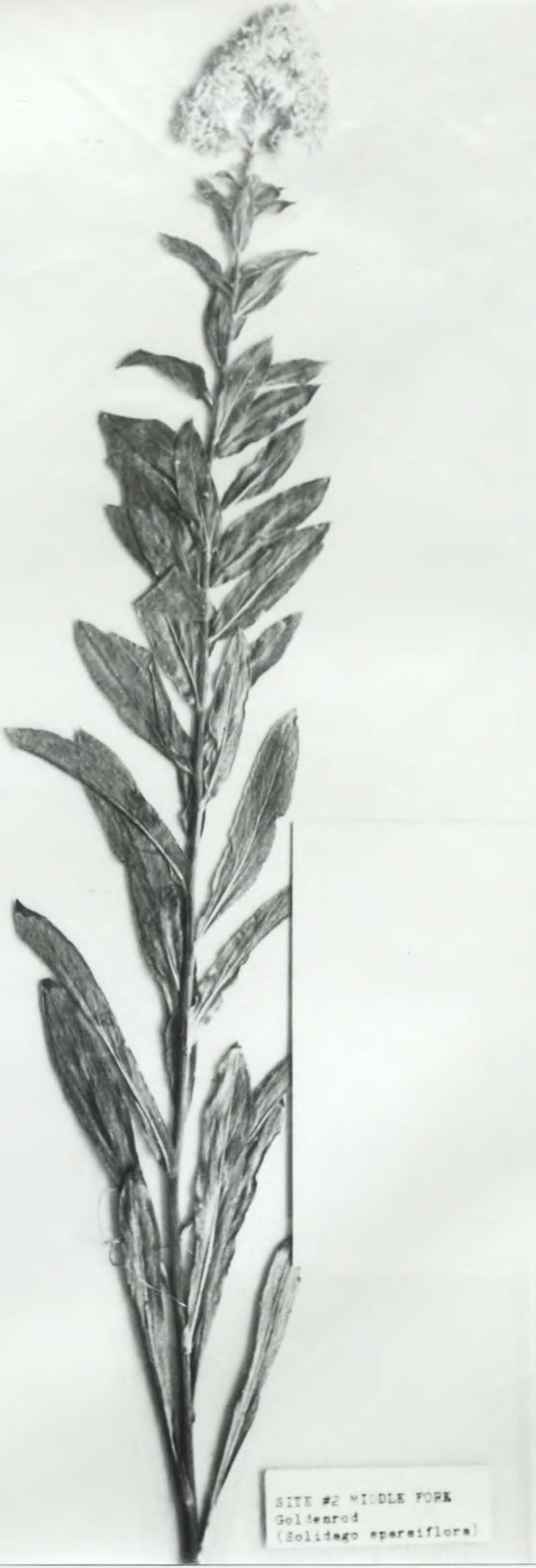


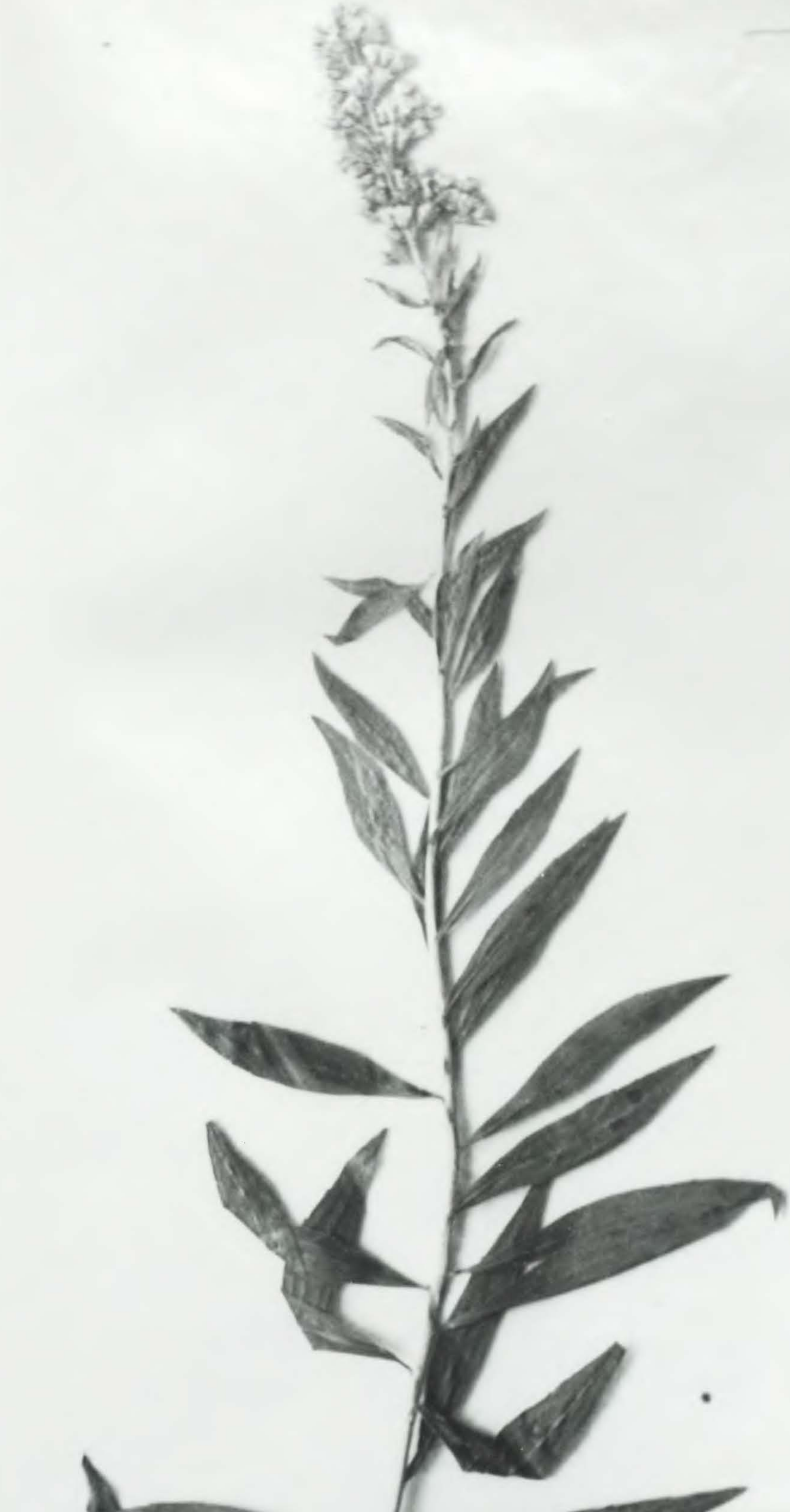
SITE #2 MIDDLE FORK
Alligator Juniper
(Juniperus deppeana)


SITE #2 MIDDLE FORK
Prairie Junegrass
(Koeleria cristata)

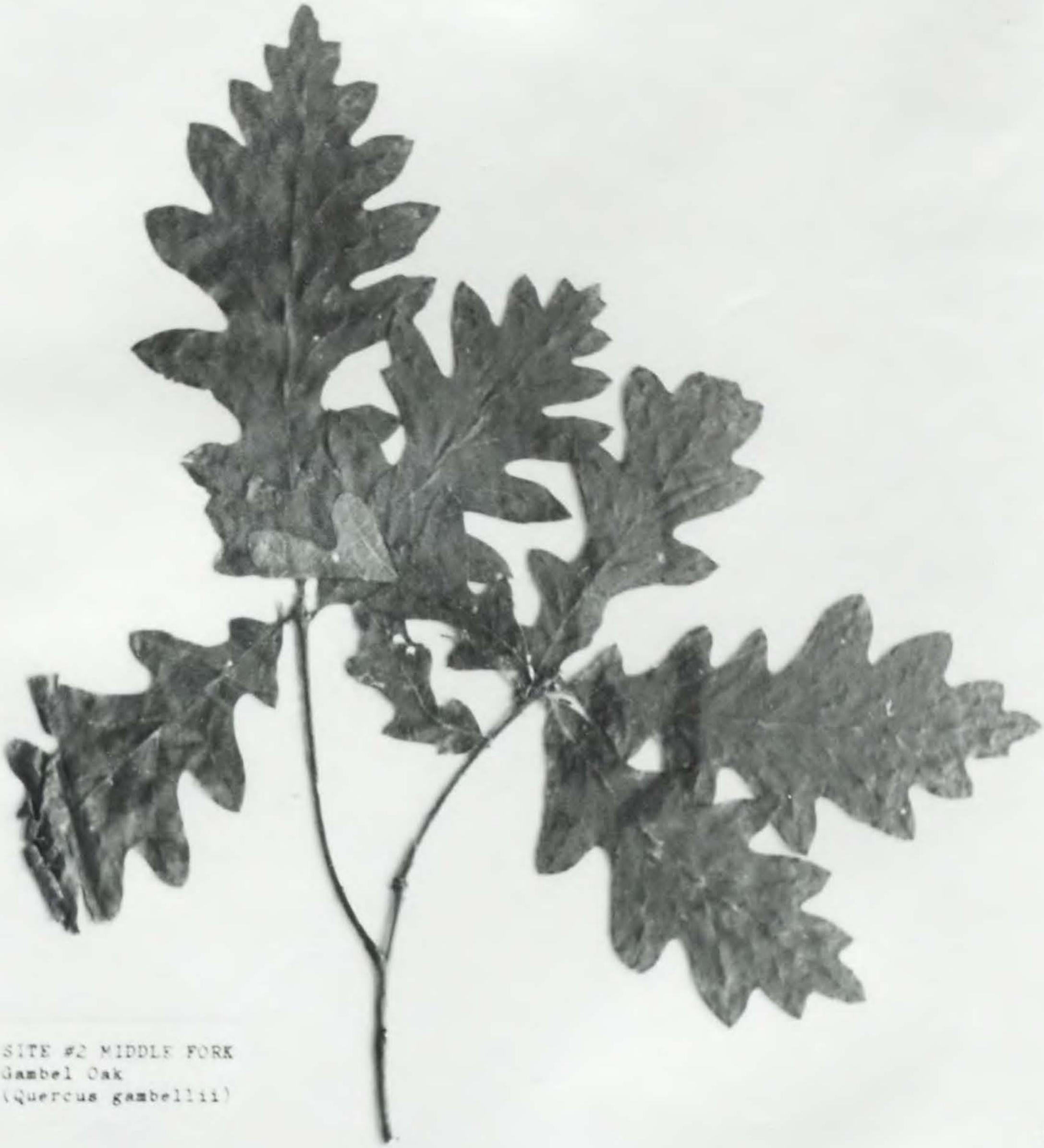


SITE #2 MIDDLE FORK
Pringle Needlegrass
(Stipa pringlei)

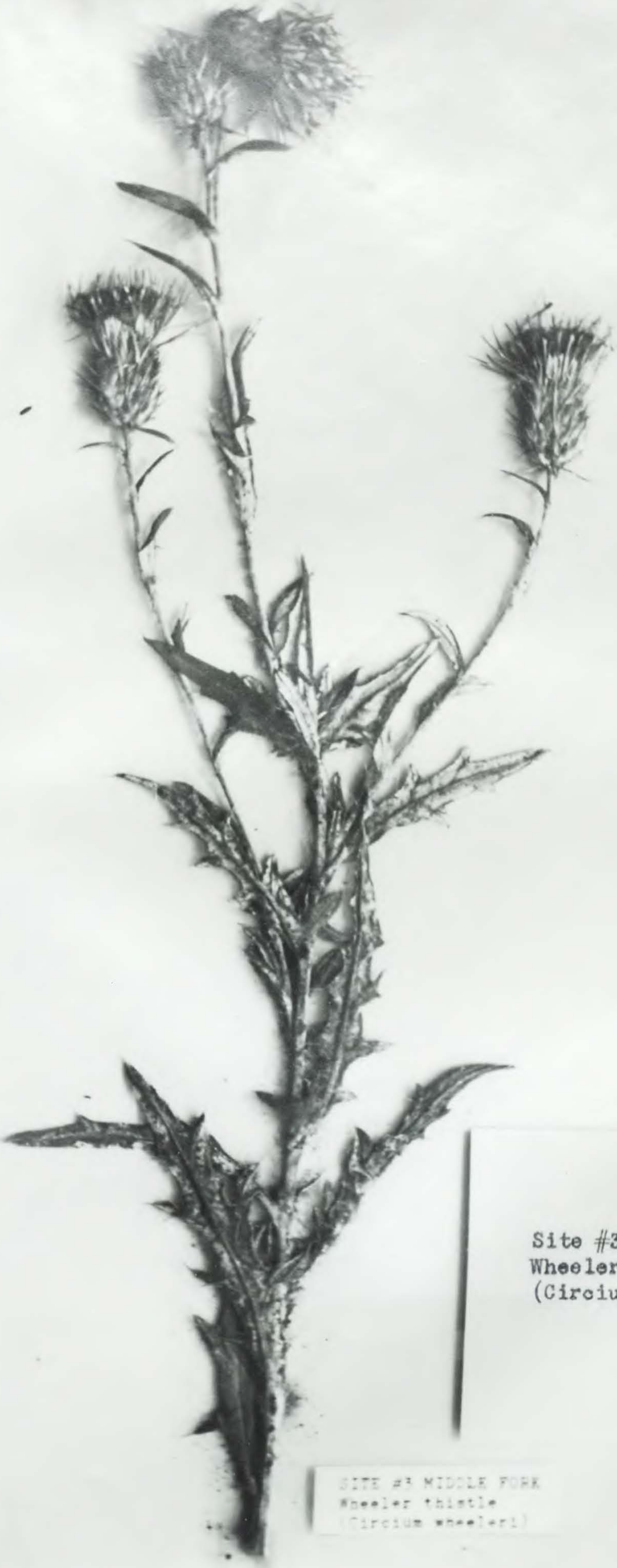

SITE #2 MIDDLE FORK
Goldenrod
(Solidago sparsiflora)



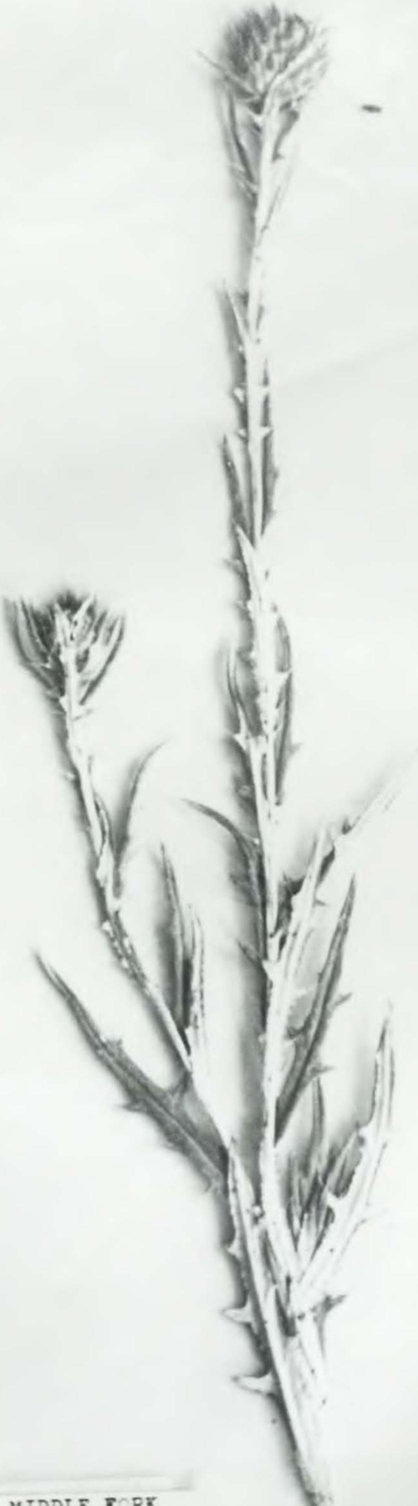
Missouri Goldenrod
(Solidago missouriensis)
Flowering habit



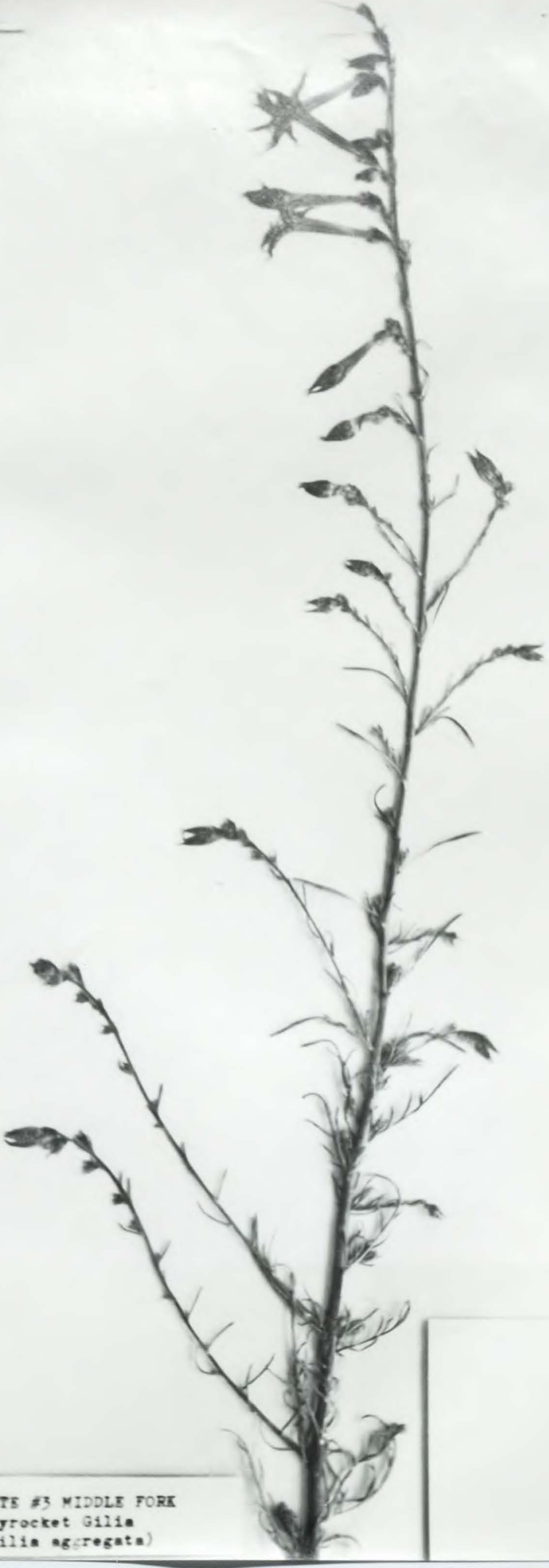
SITE #2 MIDDLE FORK
Gambel Oak
(Quercus gambellii)


SITE #3 MIDDLE FORK
Wheeler thistle
(Circium wheeleri)

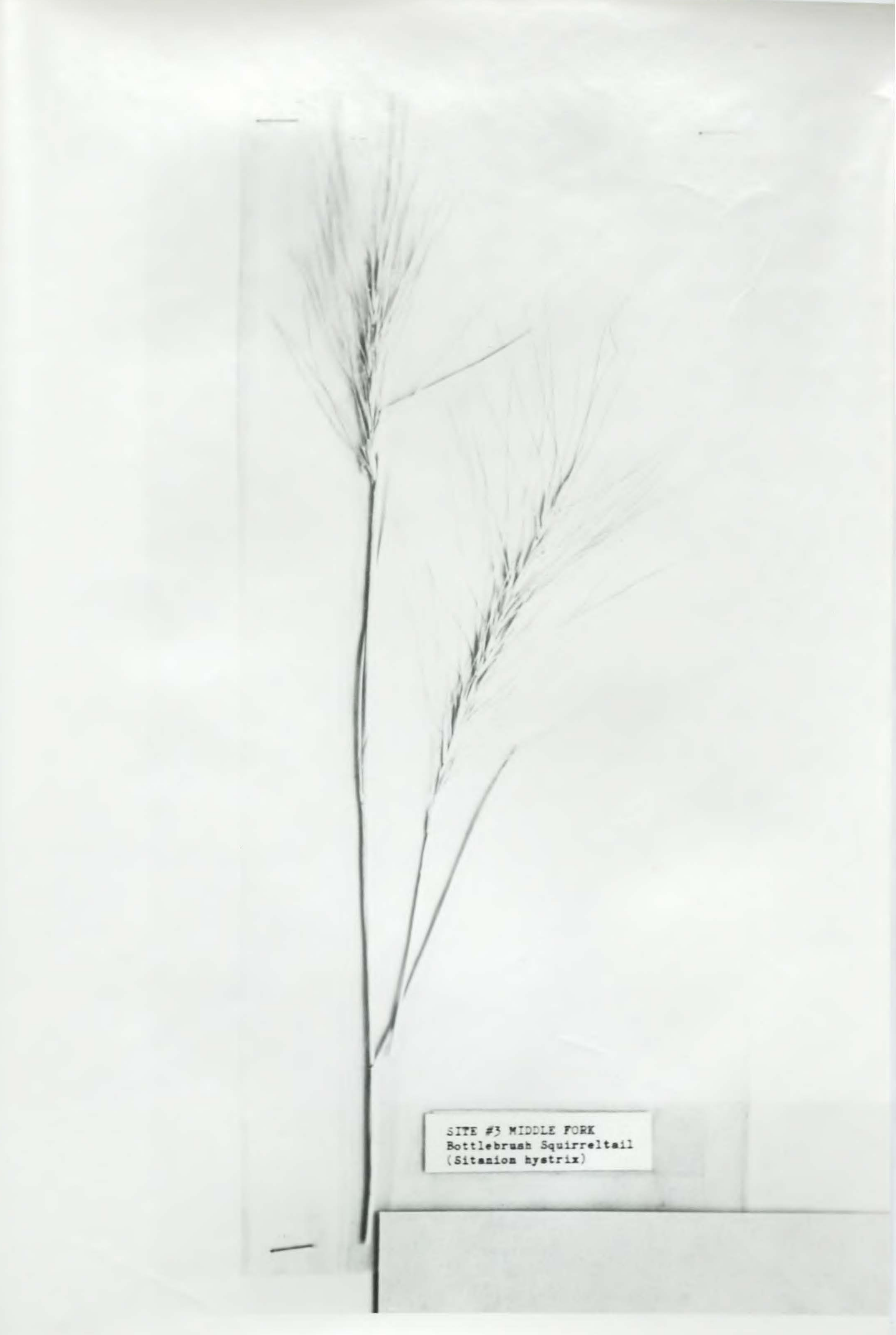
Site #3 MIDDLE FORK
Wheeler Thistle
(Circium wheeleri)

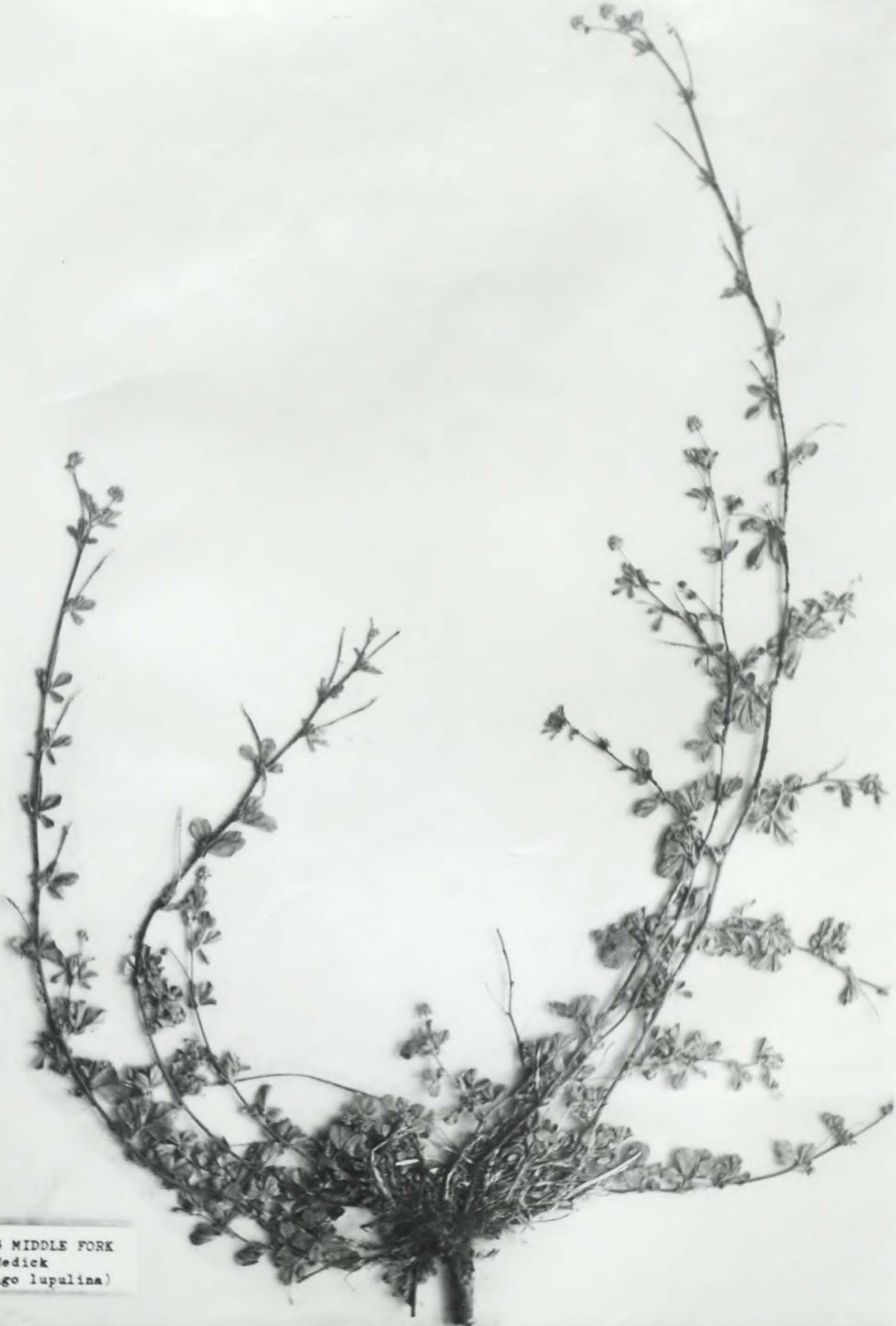


SITE #3 MIDDLE FORK
Thistle
(Cirsium Parryi)

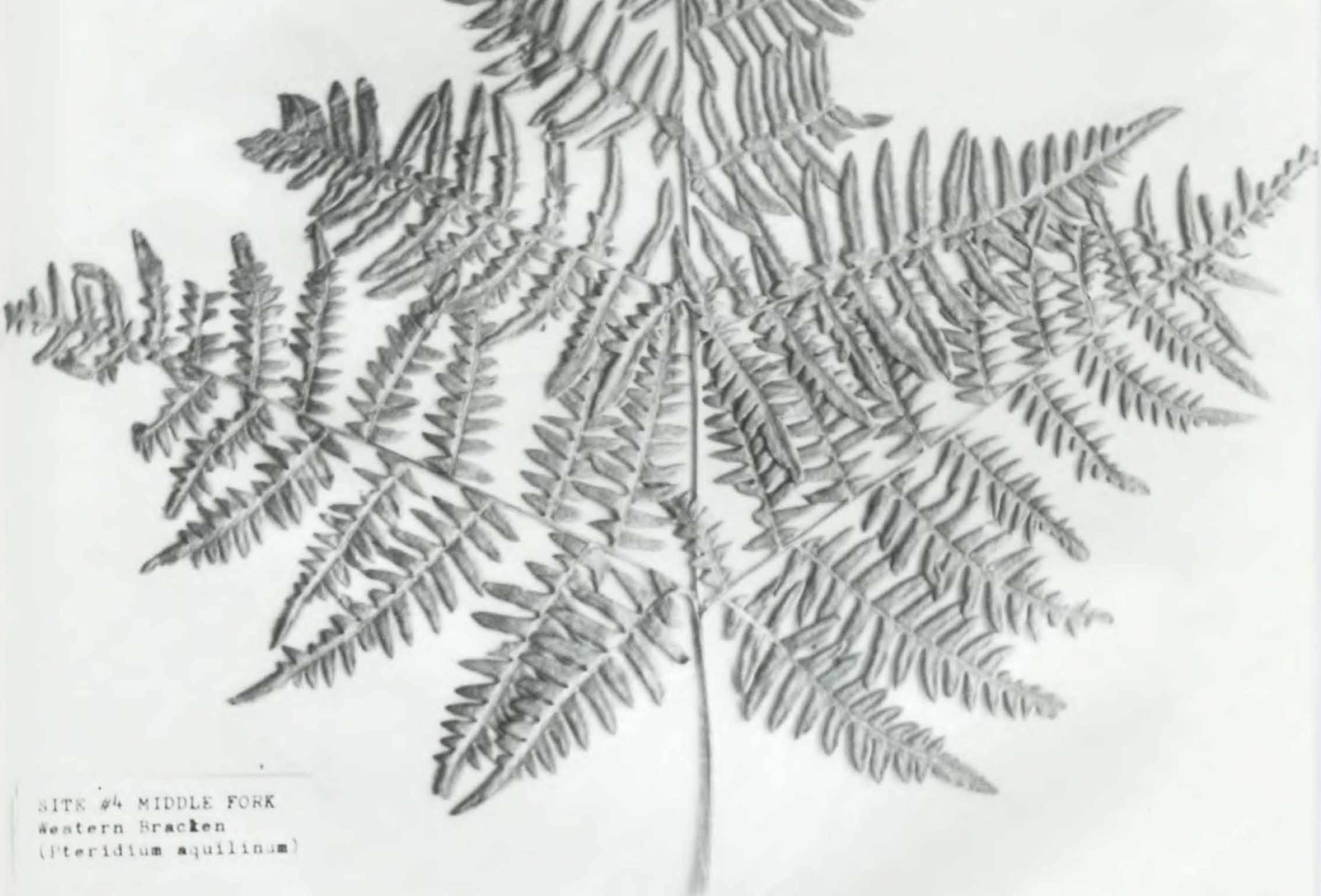


SITE #3 MIDDLE FORK
Skyrocket Gilia
(Gilia aggregata)

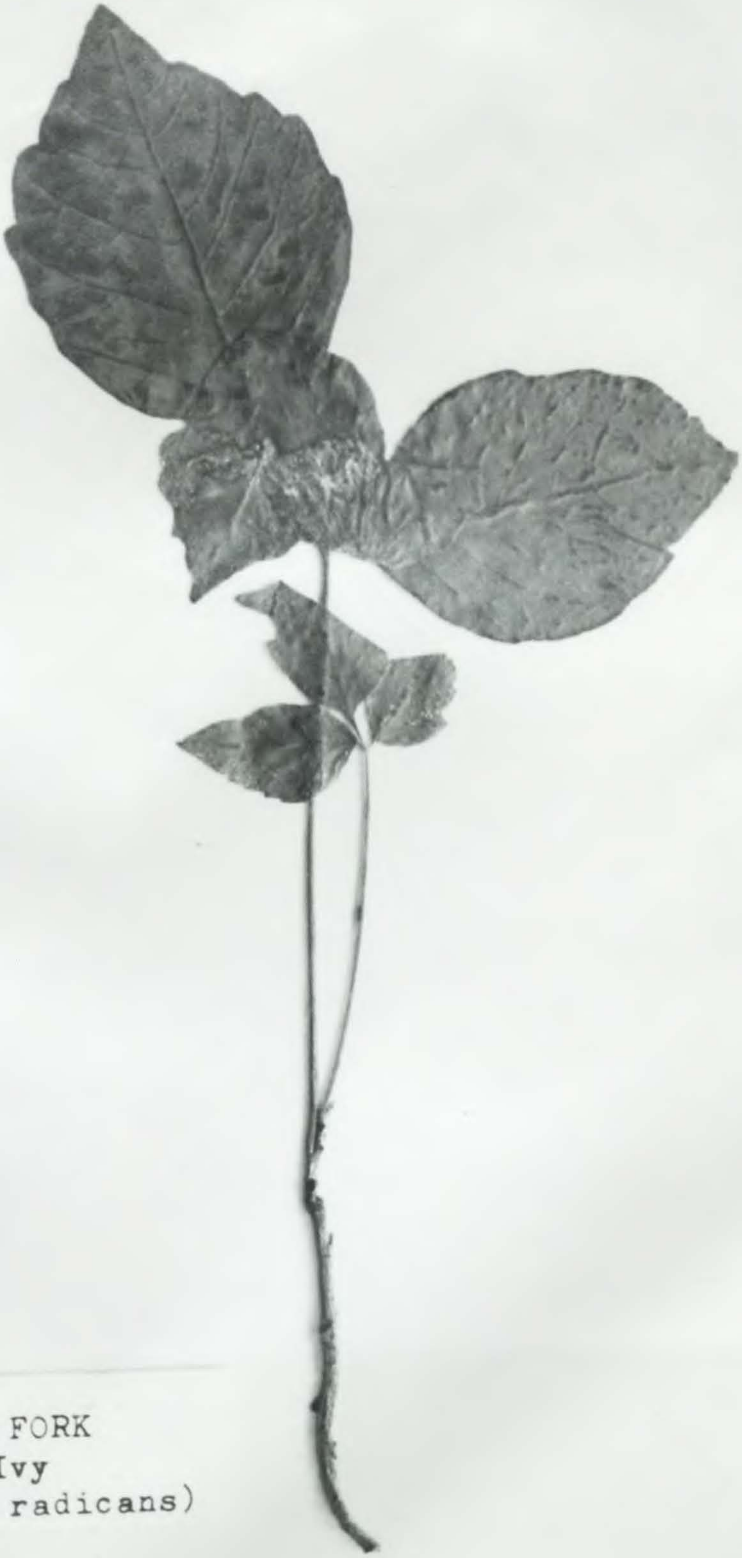

SITE #3 MIDDLE FORK
Bottlebrush Squirreltail
(Sitanion hystrix)



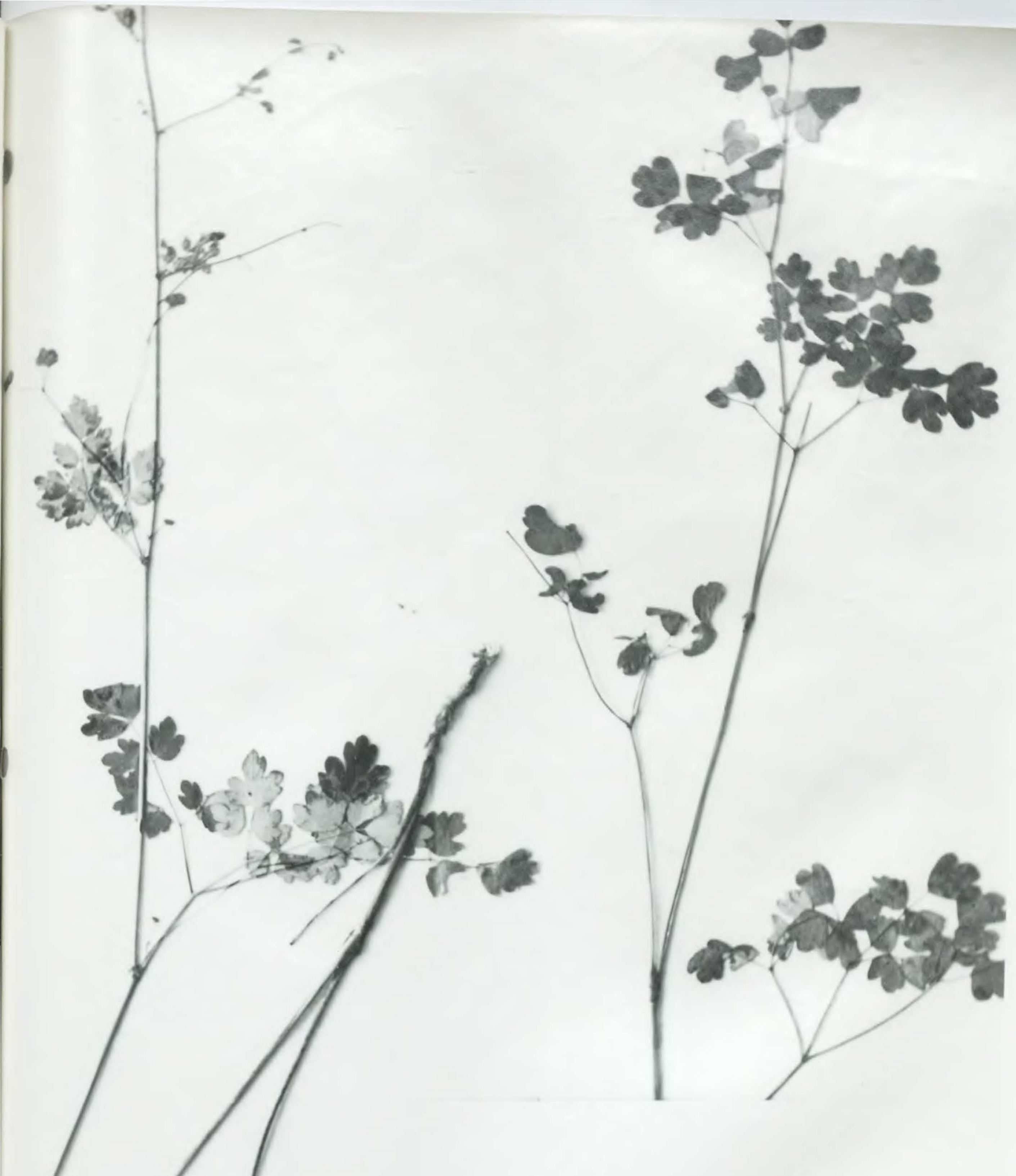
SITE #3 MIDDLE FORK
Black Medick
(Medicago lupulina)



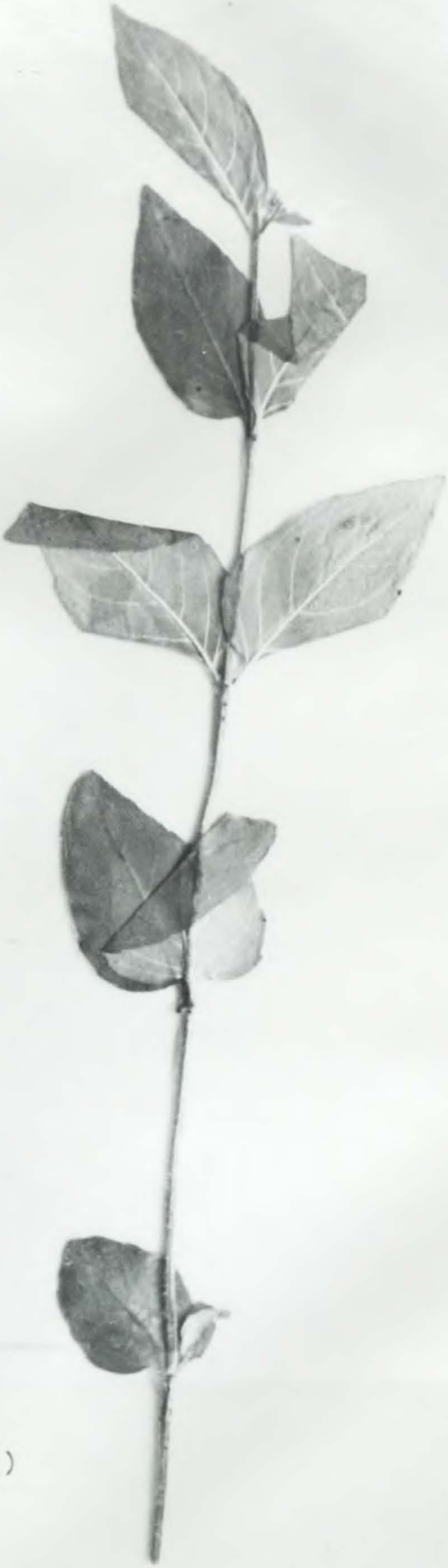
SITE #4 MIDDLE FORK
Western Bracken
(Pteridium aquilinum)



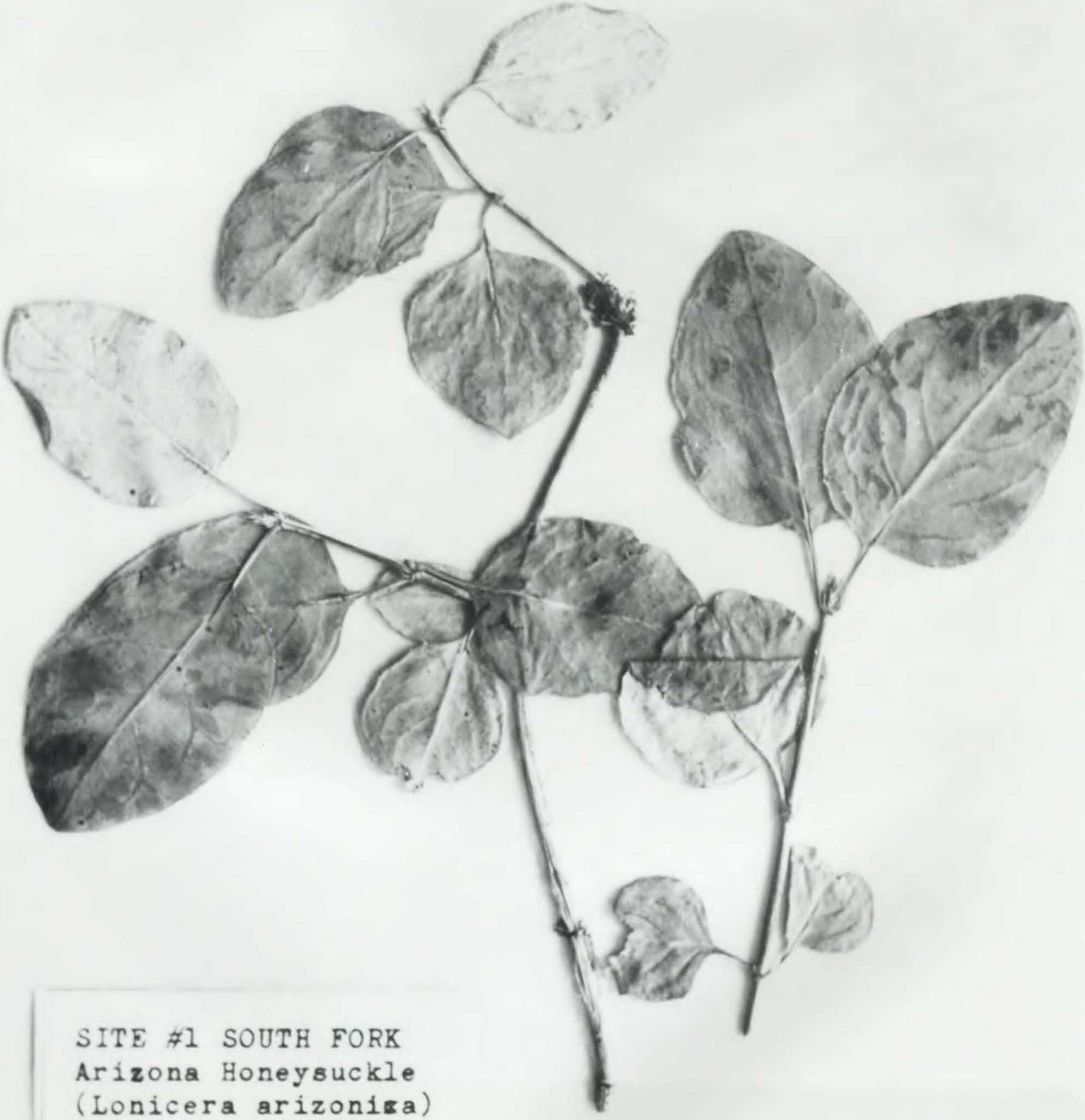
SITE #5 MIDDLE FORK
Common Poison Ivy
(Toxicodendron radicans)



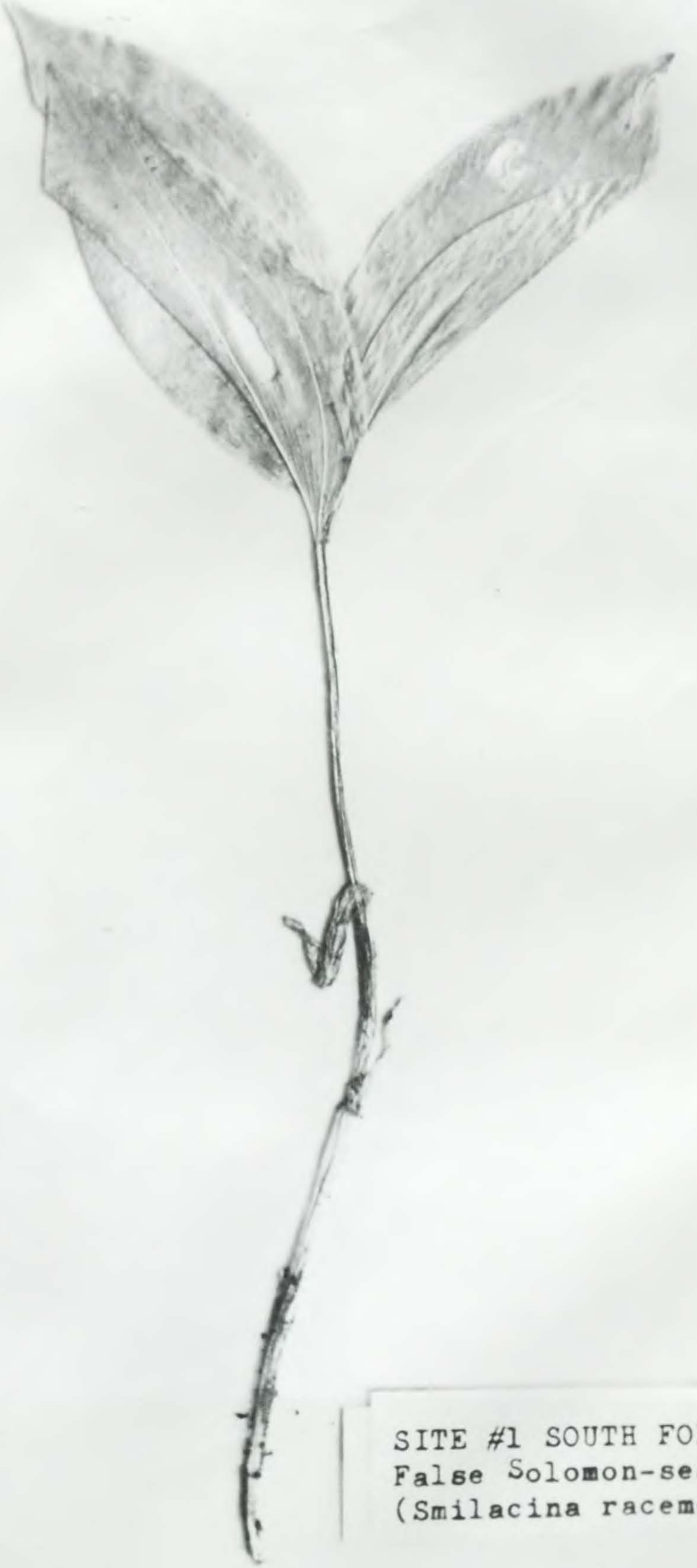
SITE #6 MIDDLE FORK
Meadow-rue
(Thalictrum fendleri)



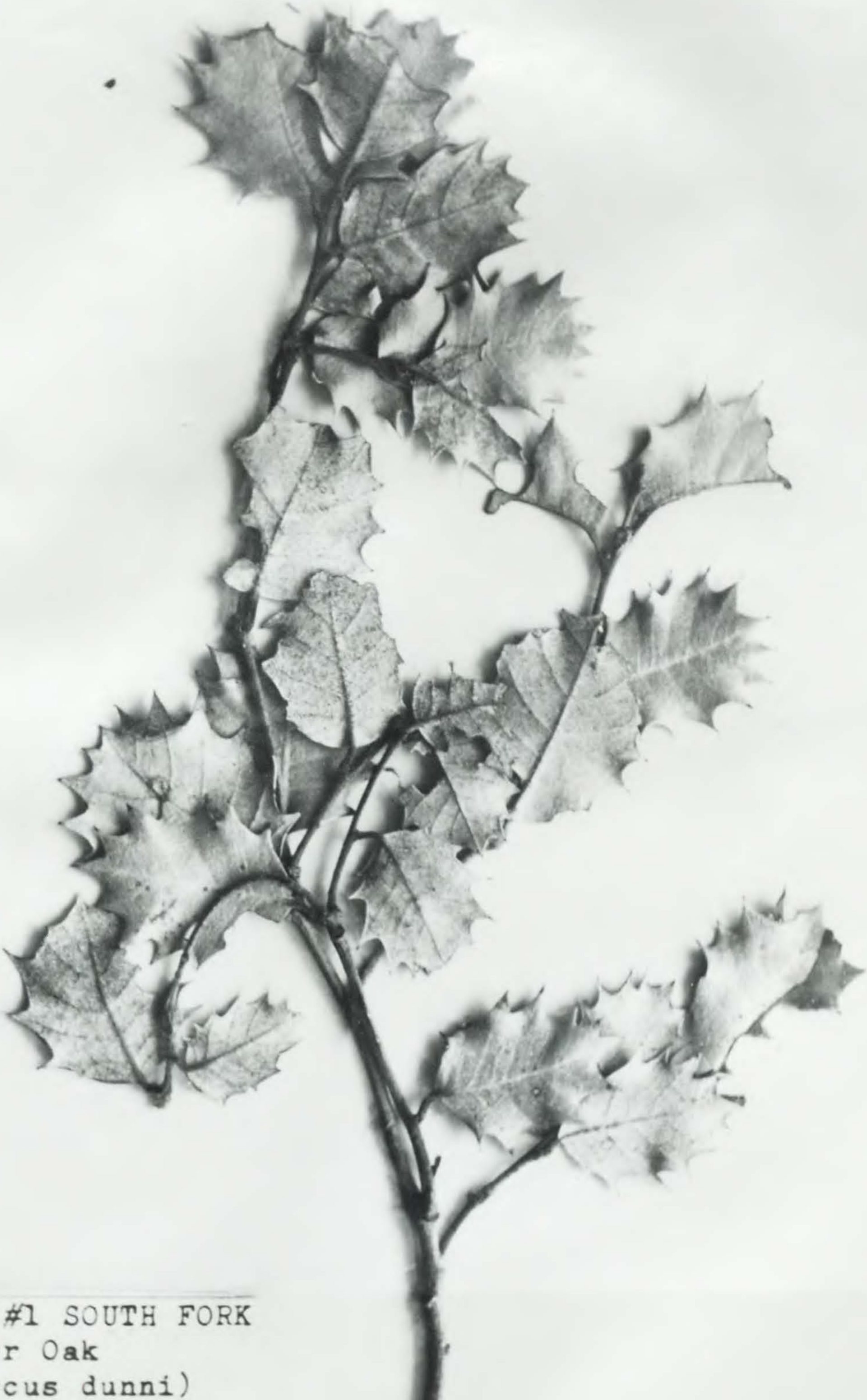
SITE #6 MIDDLE FORK
Beebalm
(Monarda menthaefolia)



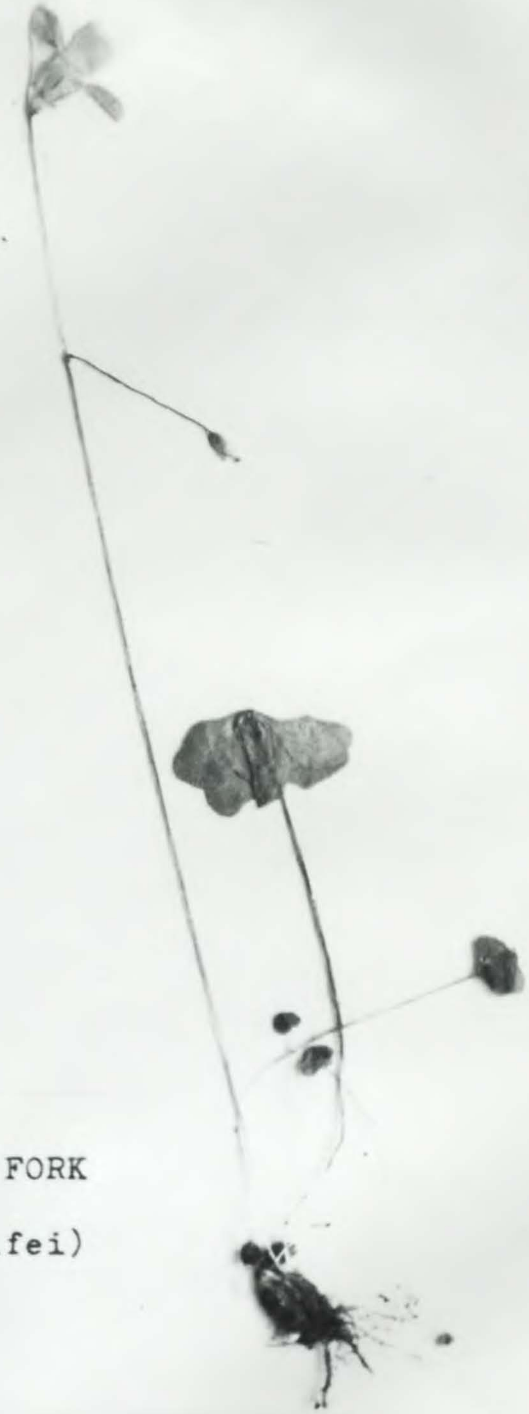
SITE #1 SOUTH FORK
Arizona Honeysuckle
(Lonicera arizoniza)



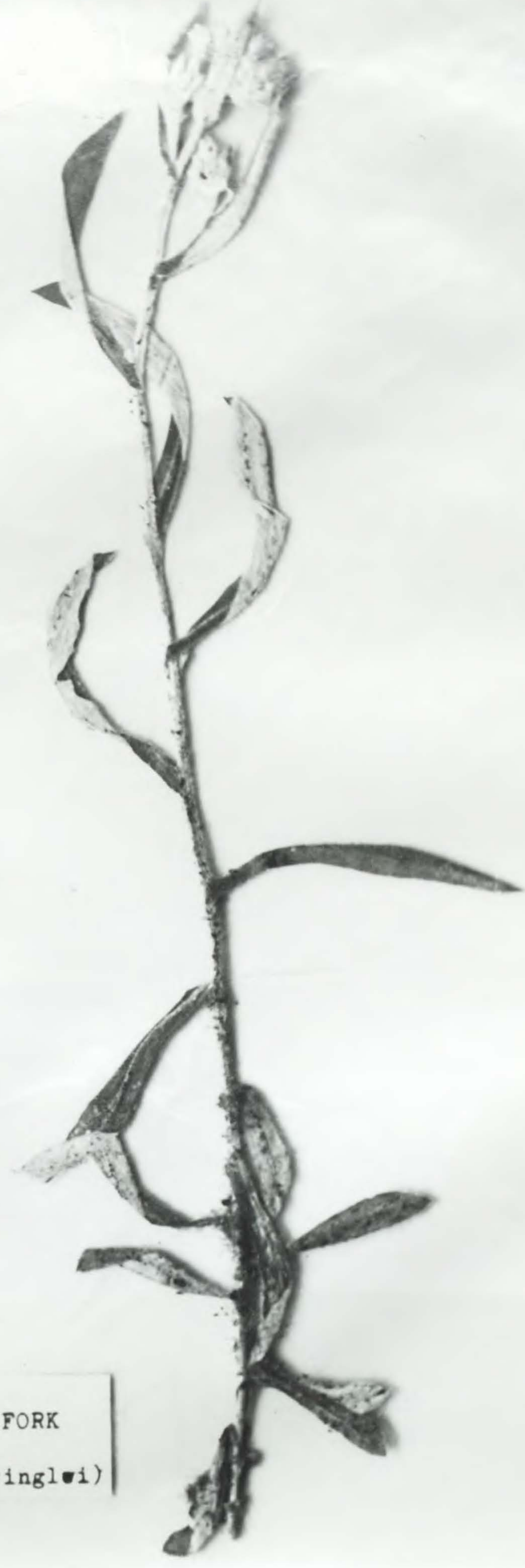
SITE #1 SOUTH FORK
False Solomon-seal
(Smilacina racemosa)



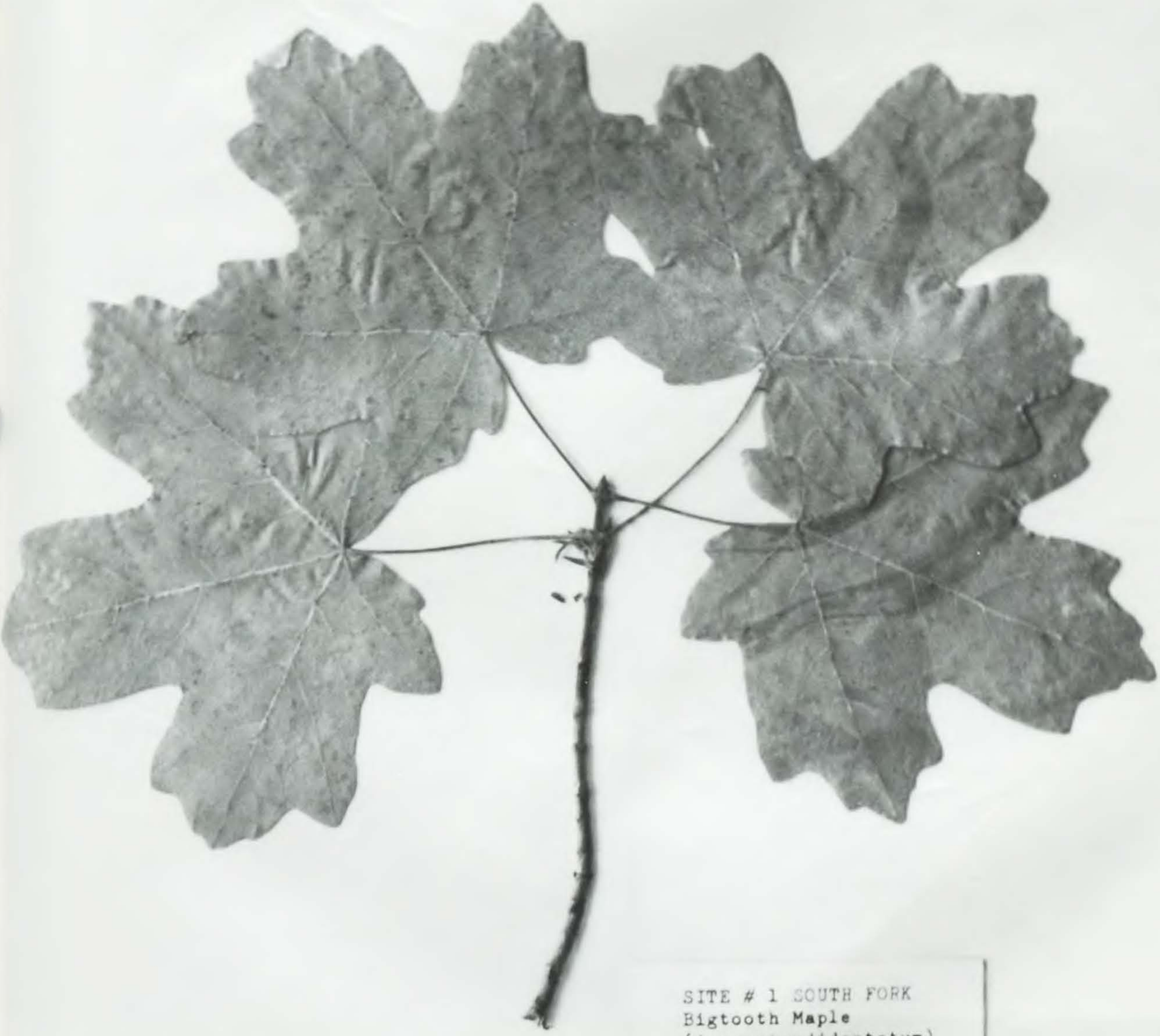
SITE #1 SOUTH FORK
Palmer Oak
(Quercus dunni)



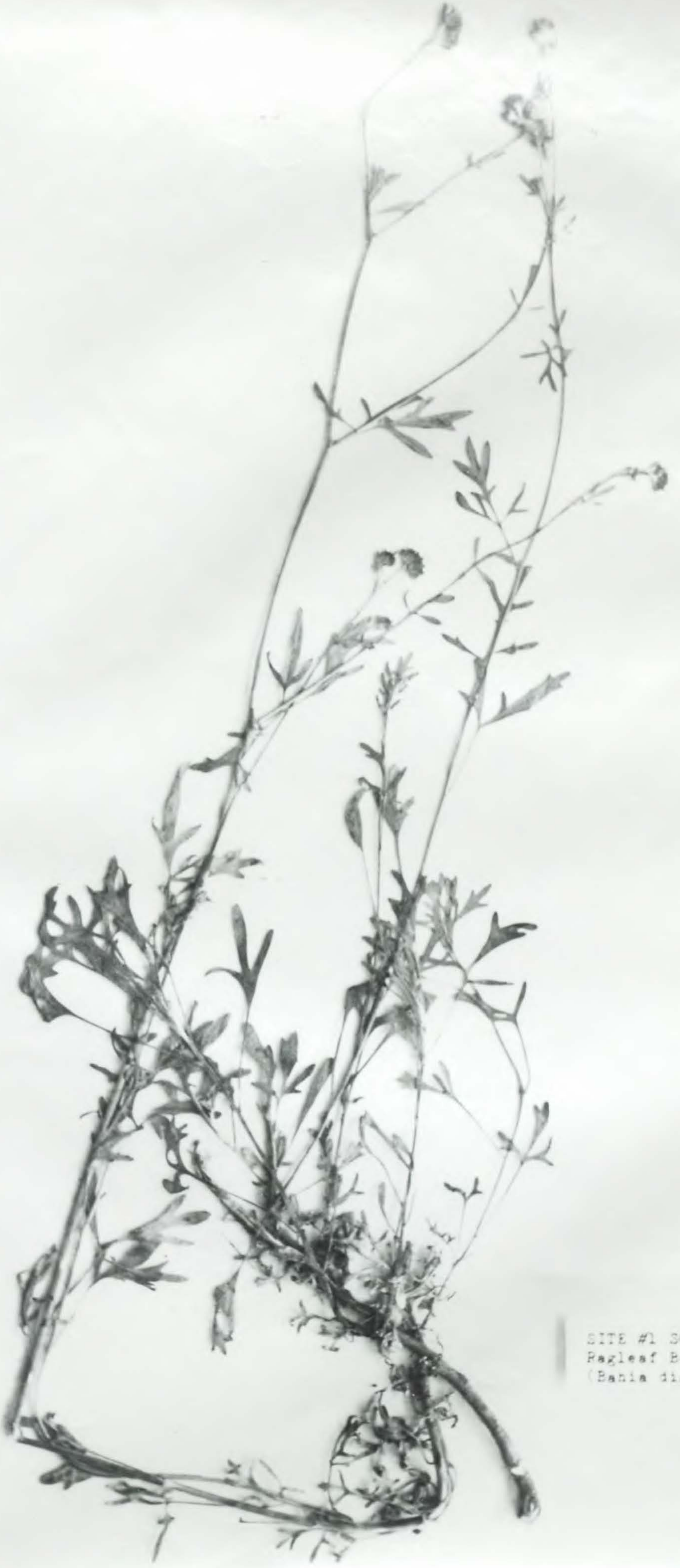
SITE #1 SOUTH FORK
Wood-Sorrel
(Oxalis metcalfei)



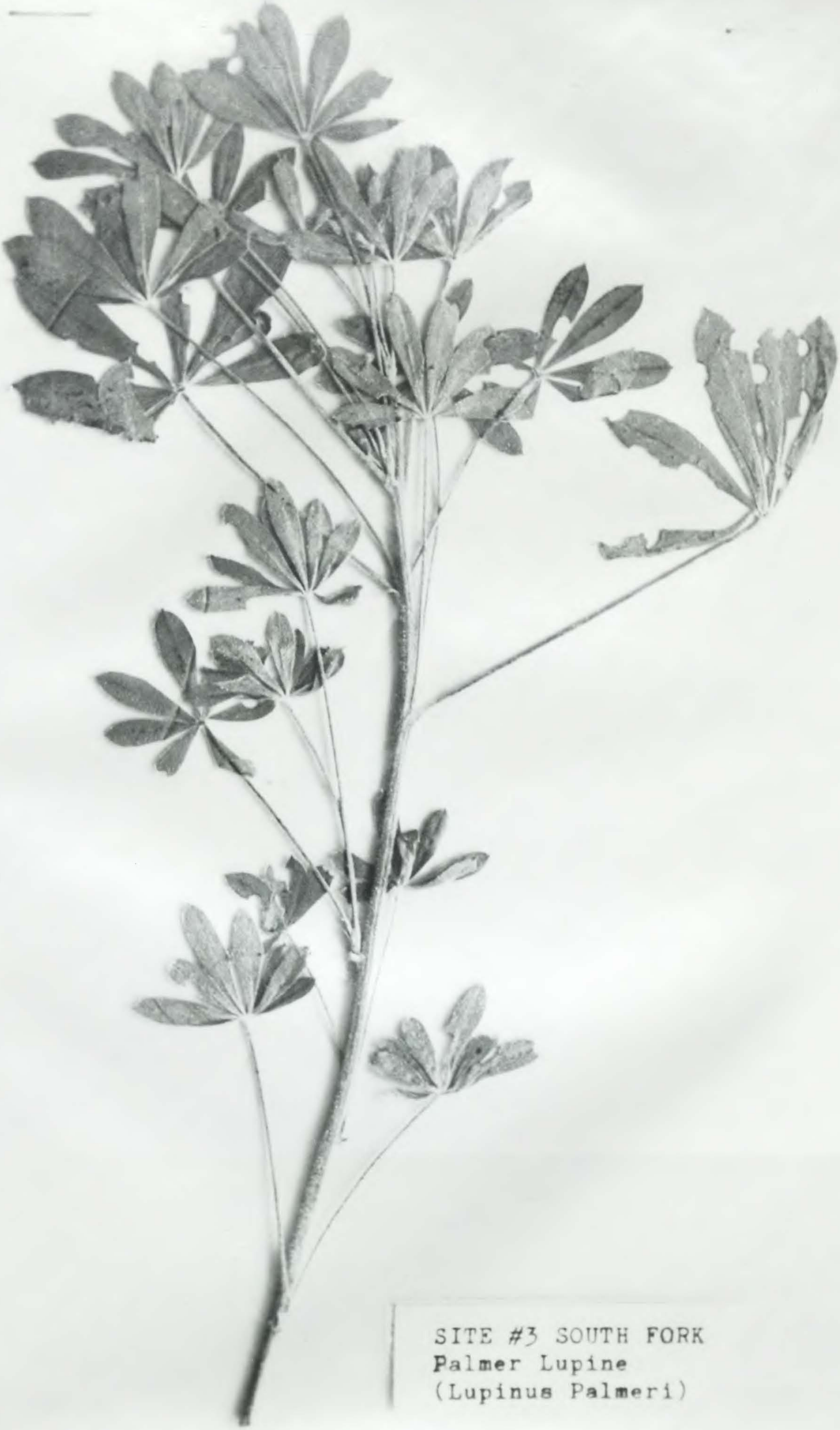
SITE #1 SOUTH FORK
Cudweed
(Gnaphalium pringlei)



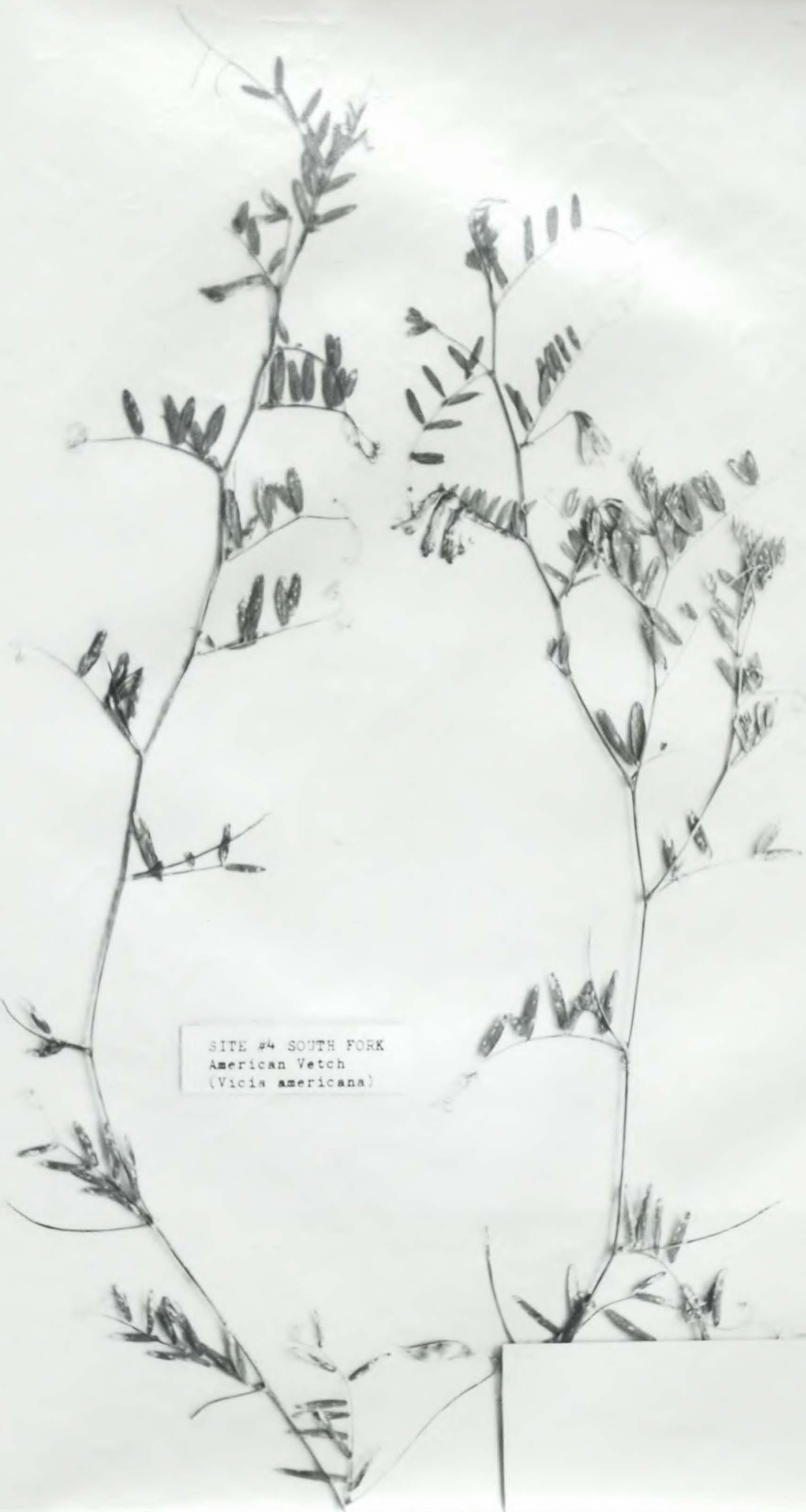
SITE # 1 SOUTH FORK
Bigtooth Maple
(Acer grandidentatum)



SITE #1 SOUTH FORK
Ragleaf Bahia
(Bahia dissecta)

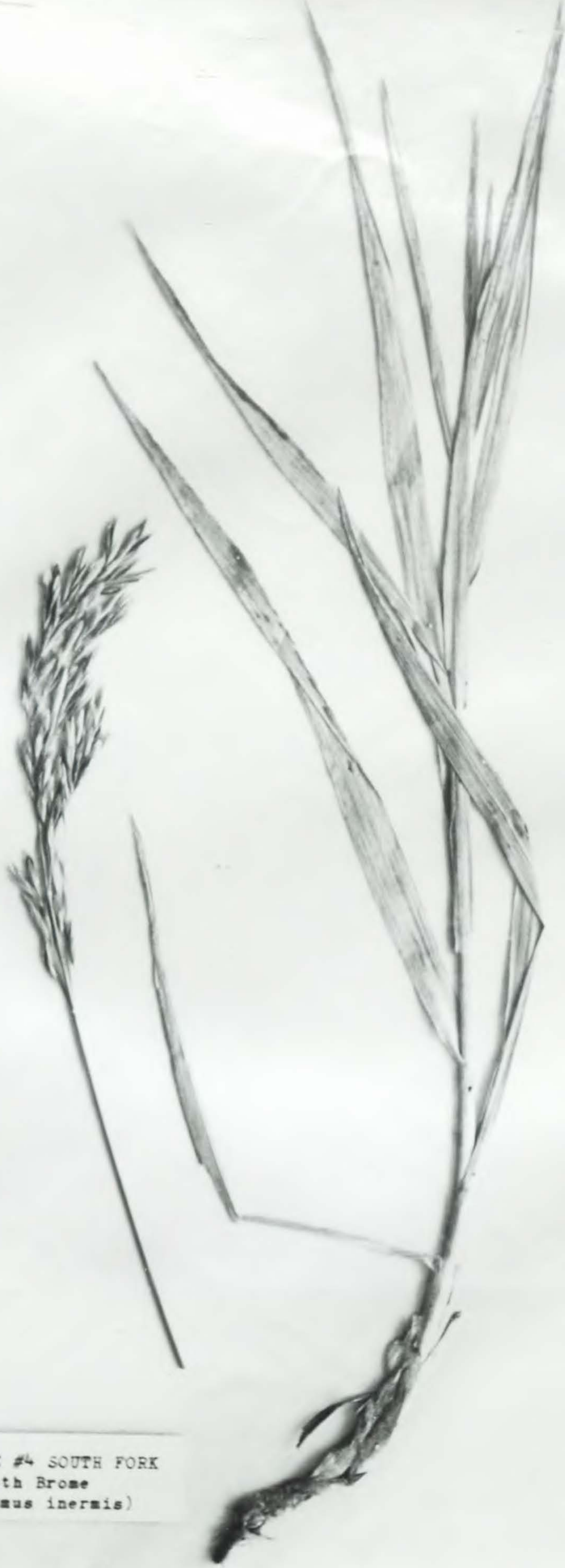


SITE #3 SOUTH FORK
Palmer Lupine
(Lupinus Palmeri)

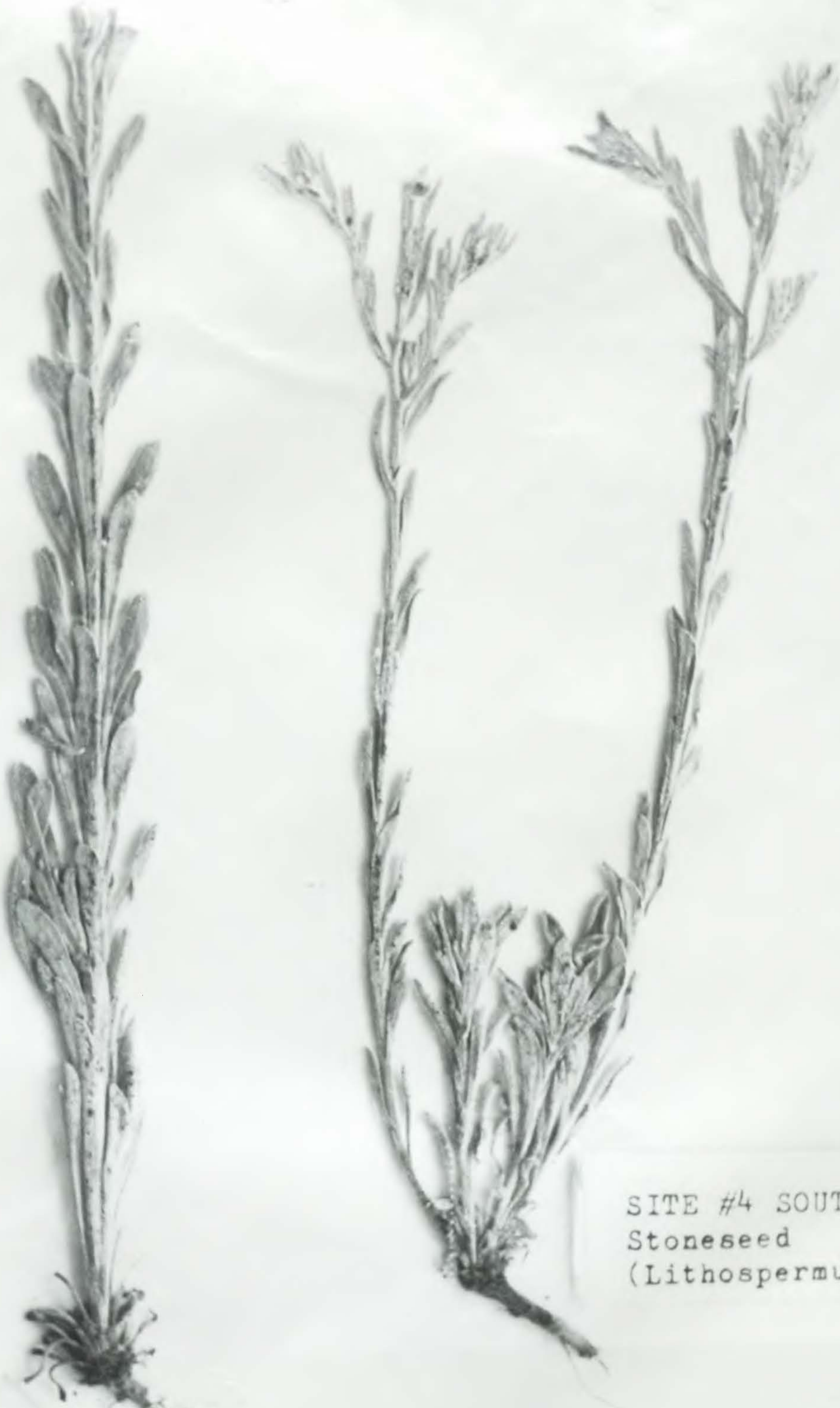


SITE #4 SOUTH FORK
American Vetch
(Vicia americana)

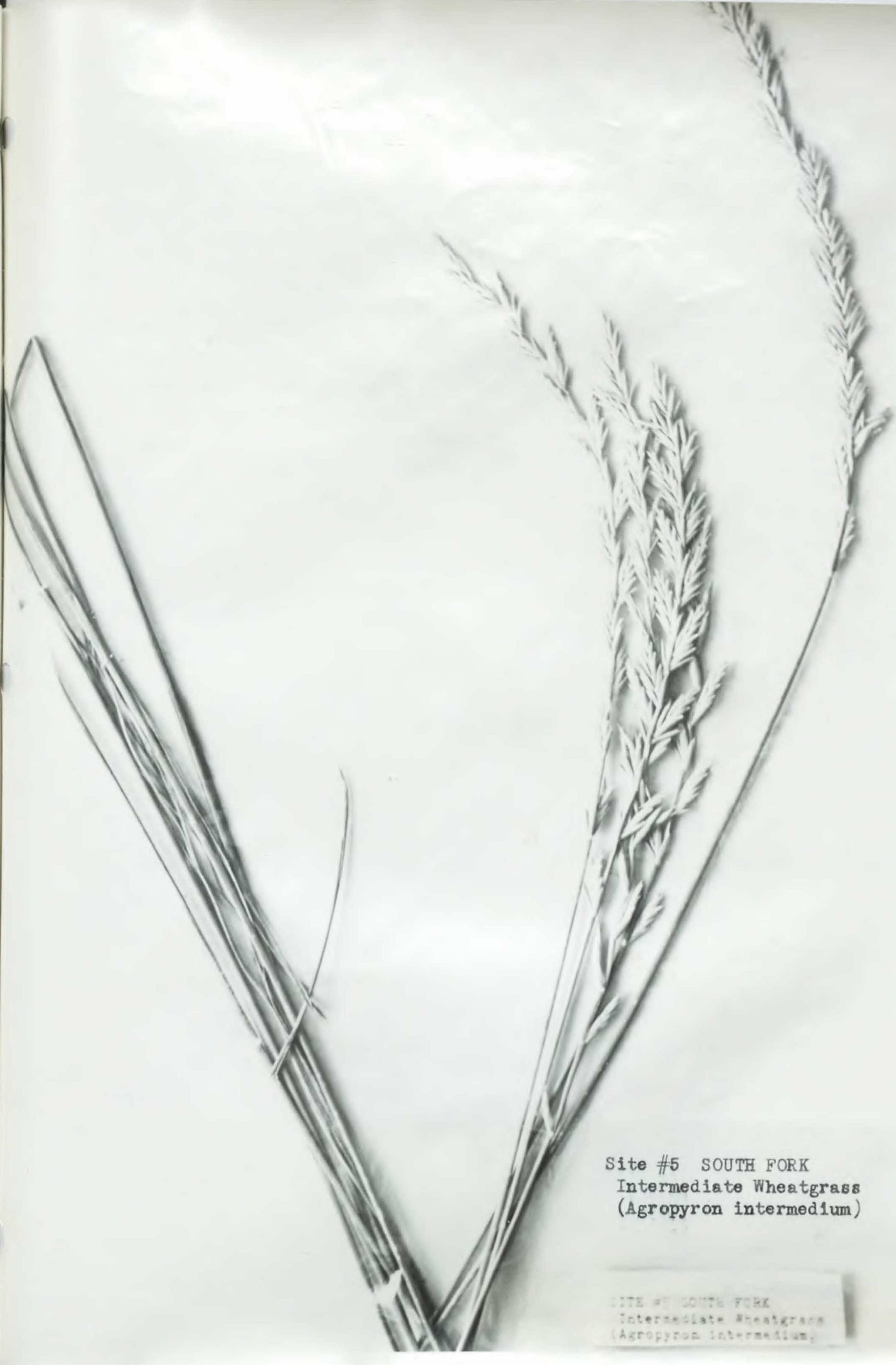
SITE #4 SOUTH FORK
Slender Wheatgrass
(Agropyron trachycalum)



SITE #4 SOUTH FORK
Smooth Brome
(Bromus inermis)

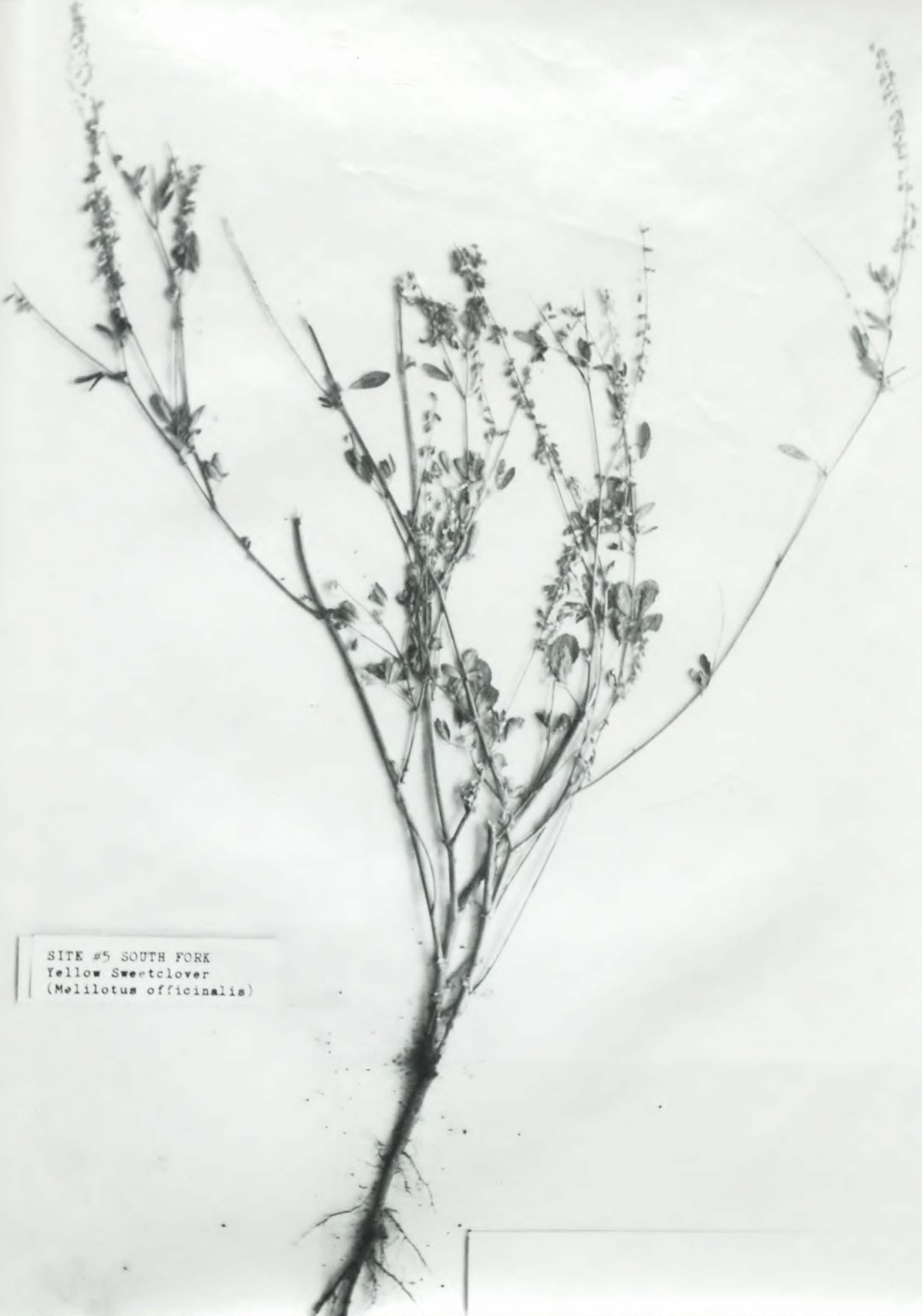


SITE #4 SOUTH FORK
Stoneseed
(Lithospermum sp.)

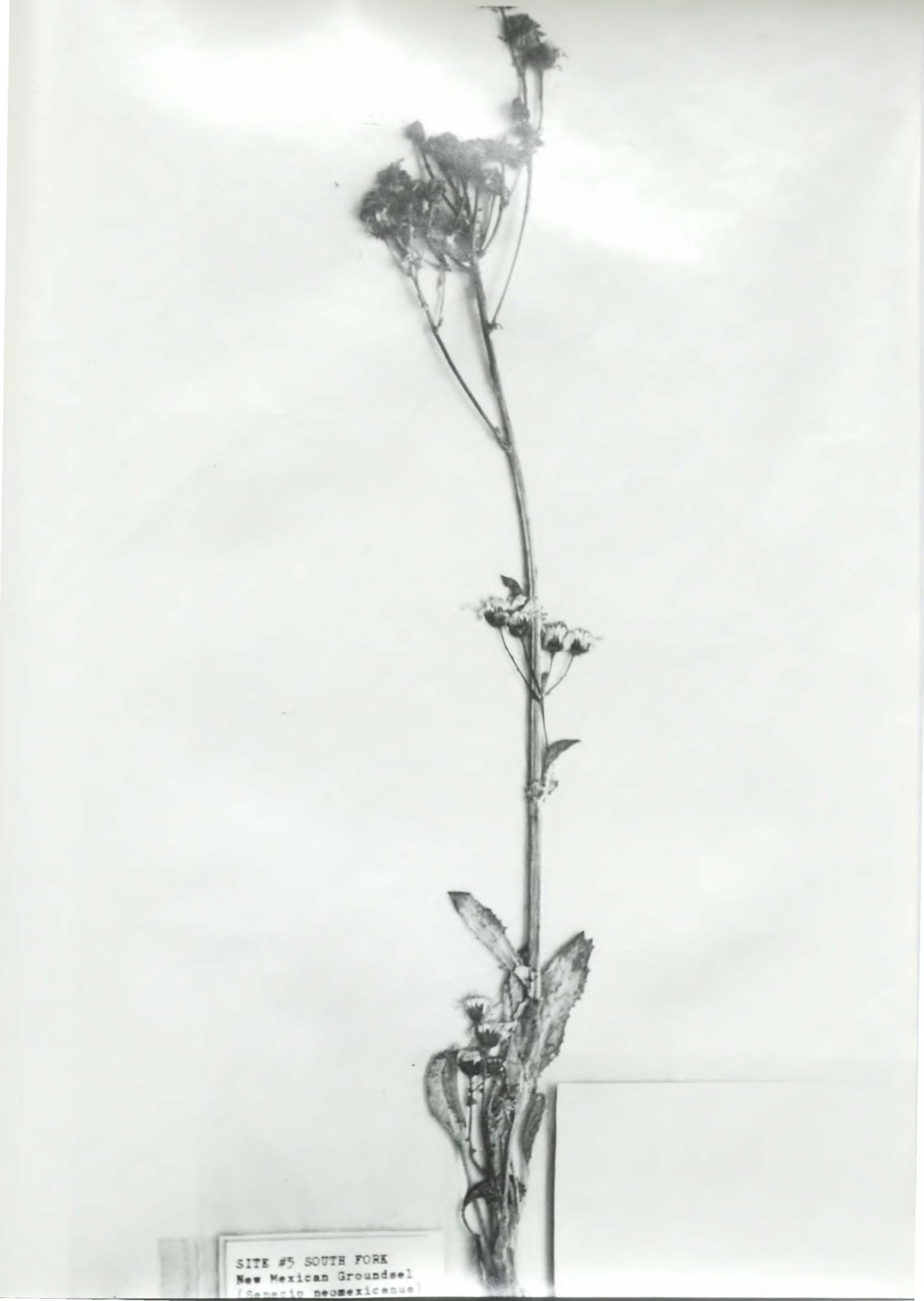


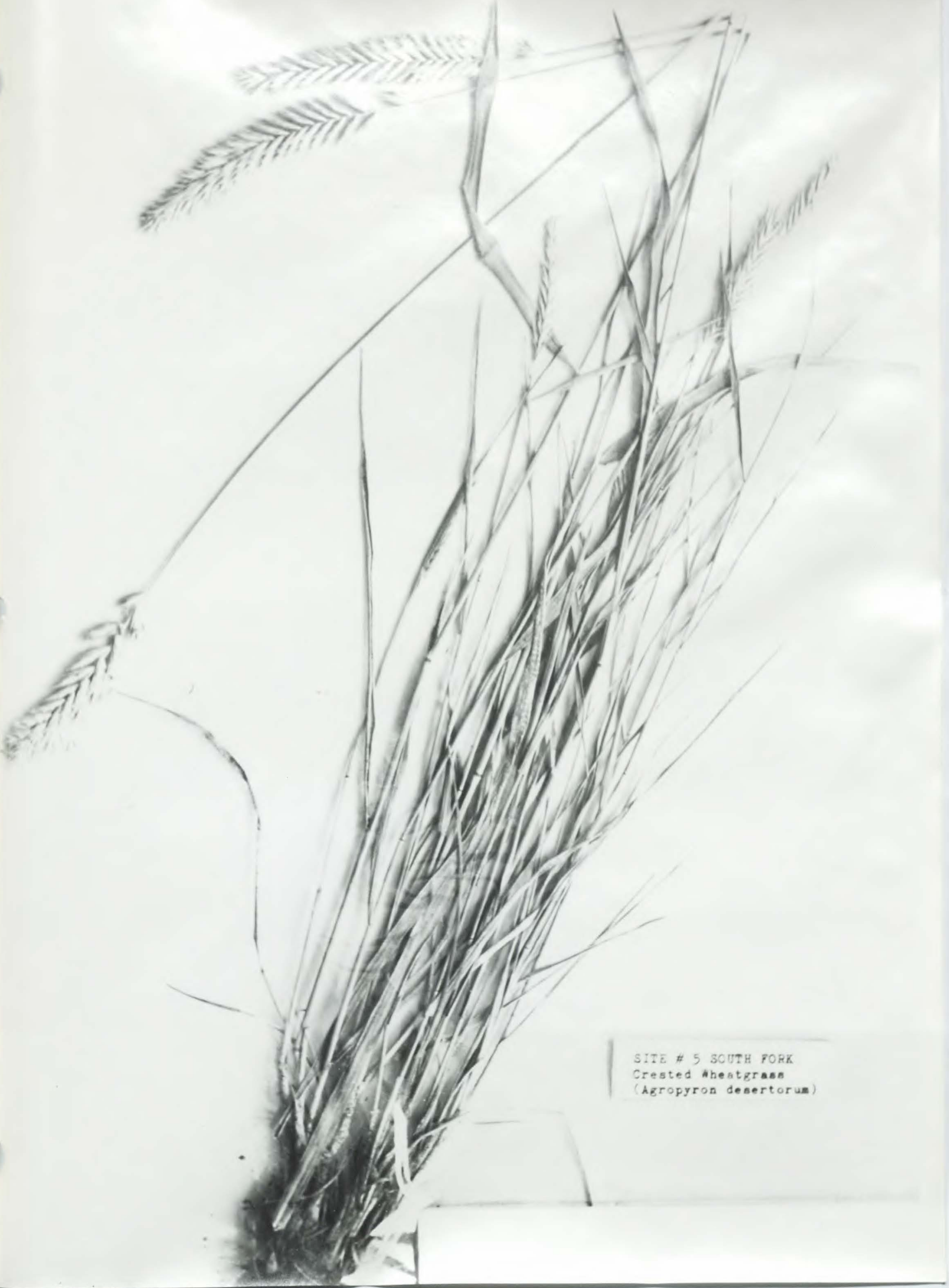
Site #5 SOUTH FORK
Intermediate Wheatgrass
(Agropyron intermedium)

SITE #5 SOUTH FORK
Intermediate Wheatgrass
(Agropyron intermedium)

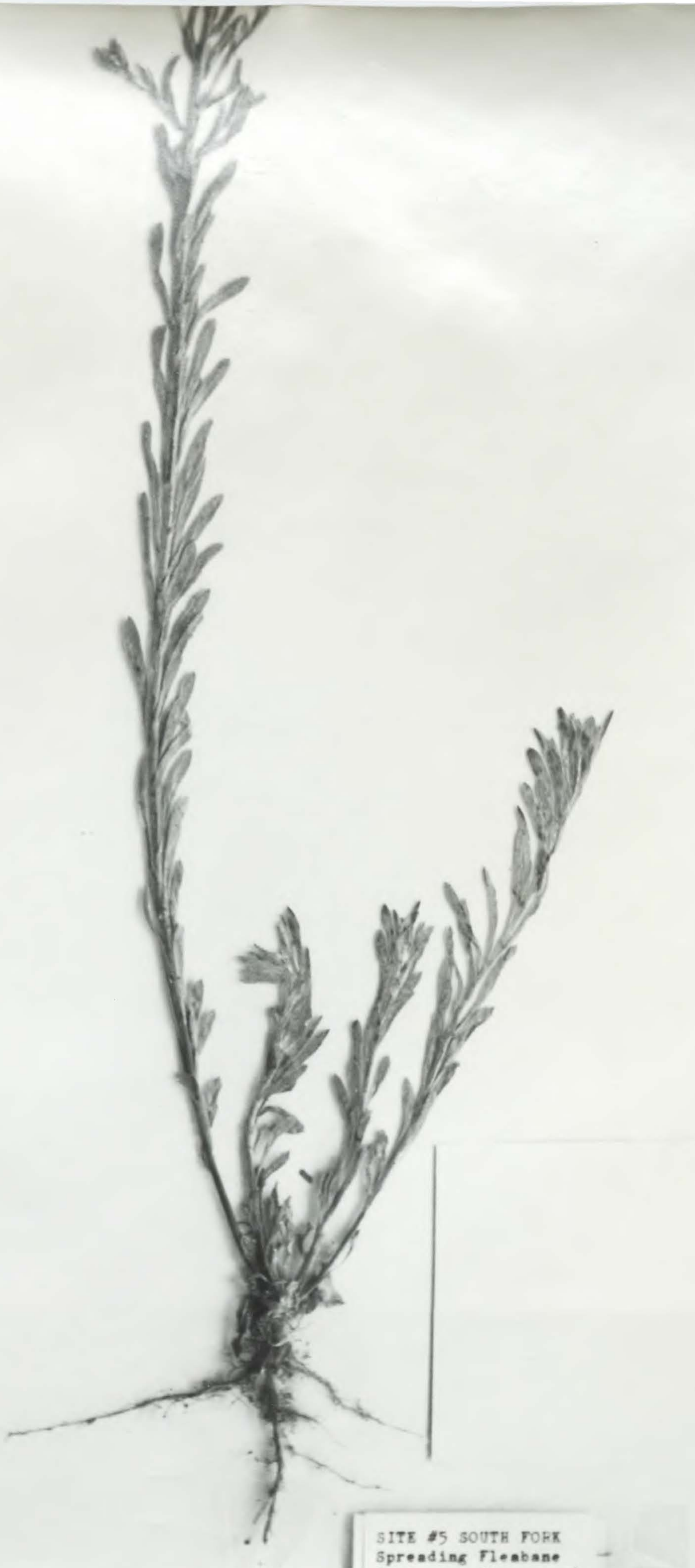


SITE #5 SOUTH FORK
Yellow Sweetclover
(Melilotus officinalis)


SITE #5 SOUTH FORK
New Mexican Groundsel
(Senecio neomexicanus)



SITE # 5 SOUTH FORK
Crested Wheatgrass
(Agropyron desertorum)


SITE #5 SOUTH FORK
Spreading Fleabane
(Erigeron divergens)